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NATIONAL DAM SAFETY PROGRAM. UPPER FULTON DAM (INVENTORY NUMBER--ETC(U)
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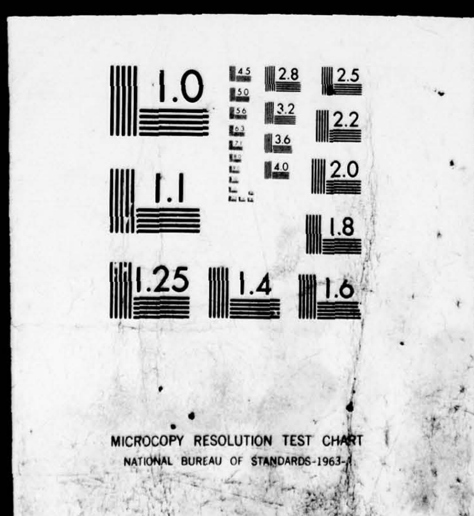

OSWEGO RIVER BASIN

UPPER FULTON DAM

OSWEGO COUNTY
NEW YORK

INVENTORY № NY 408

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM.

(6) Upper Fulton Dam (Inventory Number NY-408). Oswego River Basin, Oswego County, New York. Phase I Inspection Report,

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(10) John B. Stetson

(15) DACW51-79-C-0001

[redacted]

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NEW YORK DISTRICT CORPS OF ENGINEERS

~~JULY 1979~~

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Oswego County
Fulton

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

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1. Within one year of notification, complete the following investigations:

   a. Perform a detailed structural investigation involving borings to determine uplift pressures on the dam section, to evaluate the condition of the dam's concrete and to evaluate the subsurface condition immediately upstream and downstream of the dam.

   b. Perform investigations to evaluate the structural condition of the tainter gate system.

2. The remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified:

   a. Repair the spillway system. The deteriorated concrete should be removed prior to resurfacing the spillway.

   b. Repair the corner of the main weir and side channel spillway.

   c. Repair the subsurface condition under the dam and below the dam. Grouting to improve the dam's subsurface condition may be required.

   d. Repair the stone masonry river side wall of the east bank generator station to eliminate leakage and seepage. Repair the concrete capping on top of the wall.

   e. Repair the sluice gates controlling the forebay of the east bank generating station. (Gates must be operable in order to accomplish item #d above.)

   f. Repair the concrete at the tainter gates, or replace the gates.

Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity of 50,000 cfs at 61% of the PMF, with the PMF and 1/2 PMF flows at 81,900 cfs and 46,800 cfs respectively. The spillway has been determined to be inadequate to pass the PMF. However, the spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria, since the dam is capable of passing the 1/2 PMF without being overtopped.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Upper Fulton Dam at Lock 2, NY408

State Located New York
County Located Oswego
Stream Oswego River
Date of Inspection June 7, June 13, 1979

ASSESSMENT OF GENERAL CONDITIONS

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

1. Within one year of notification, complete the following investigations:

   a. Perform a detailed structural investigation involving borings to determine uplift pressures on the dam section, to evaluate the condition of the dam's concrete and to evaluate the subsurface condition immediately upstream and downstream of the dam.

   b. Perform investigations to evaluate the structural condition of the tainter gate system.

2. The remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified:

   a. Repair the spillway system. The deteriorated concrete should be removed prior to resurfacing the spillway.

   b. Repair the corner of the main weir and side channel spillway.

   c. Repair the subsurface condition under the dam and below the dam. Grouting to improve the dam's subsurface condition may be required.

   d. Repair the stone masonry river side wall of the east bank generator station to eliminate leakage and seepage. Repair the concrete capping on top of the wall.

e. Repair the sluice gates controlling the forebay of the east bank generating station. (Gates must be operable in order to accomplish item #d above.)

f. Repair the concrete at the tainter gates, or replace the gates.

Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity of 50,000 cfs at 61% of the PMF, with the PMF and 1/2 PMF flows at 81,900 cfs and 46,800 cfs respectively. The spillway has been determined to be inadequate to pass the PMF. However, the spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria, since the dam is capable of passing the 1/2 PMF without being overtopped.

Dale Engineering Company

John B. Stetson

John B. Stetson, President

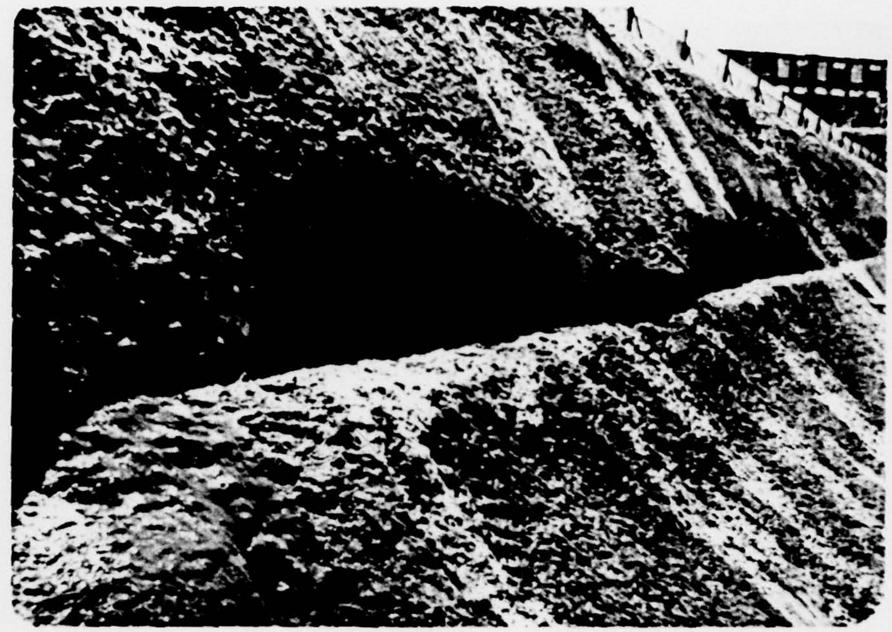
Clark H. Benn

Approved By:
Date: 28 Sept 78

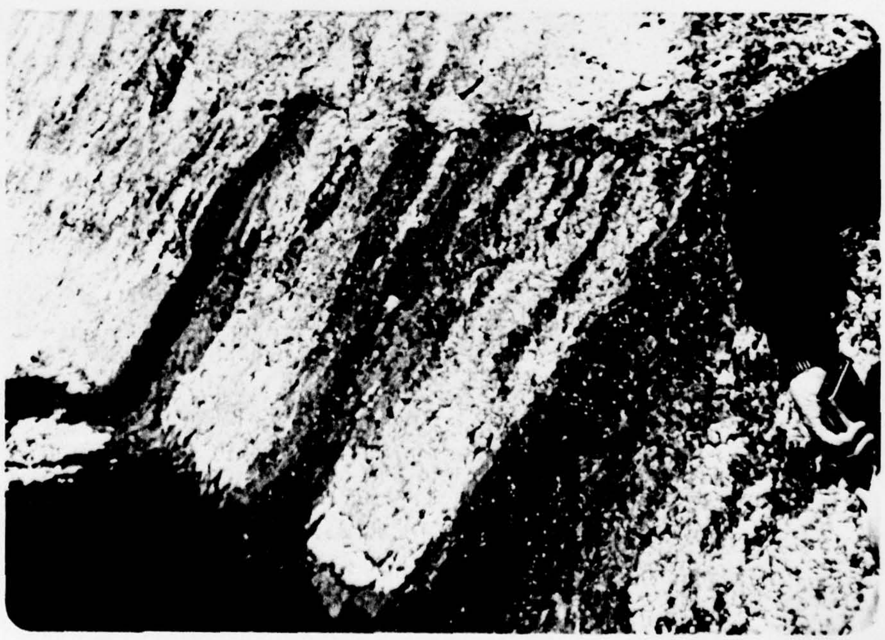
Col. Clark H. Benn
New York District Engineer

Overview of concrete gravity dam at Lock O-2 located in Fulton, New York (Upper Dam).

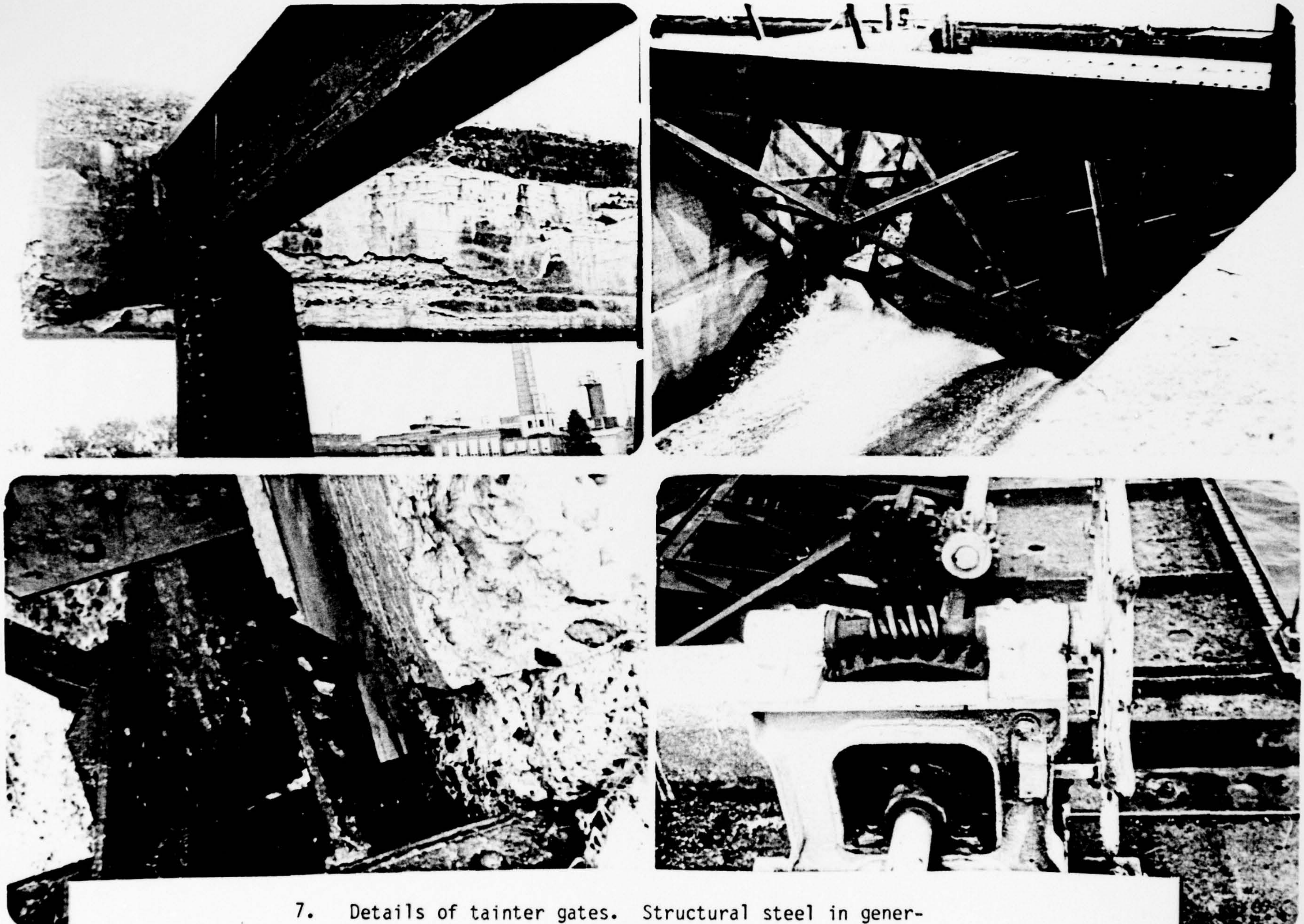
1. Closeup of deteriorated sandstone bedrock at base of spillway. An eight foot wide by two foot thick concrete thrust block is located here. Some undermining is suspected below concrete block. Severe undermining can be seen as shadowed areas of bedrock.



2. View of spillway crest with pool drawn below crest. Advanced deterioration of concrete surface has taken place across the entire spillway. Some seepage is evident between construction joints.



5. Spillway section parallel to river channel flow and in front of east side of hydropower forebay area. Notice severe deterioration of surface, haunch in top of spillway due to deterioration, and notice seepage through construction joint.



7. Details of tainter gates. Structural steel in generally good condition. Concrete piers and counterbalances show deterioration. Gates controlled with manual rack and pinion device.

8. View of east side of hydropower forebay wall. Seepage can be observed along wall. Closeup shows seepage discharge from wall at a location directly below twin smoke stacks.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - UPPER FULTON DAM ID# - NY408

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of Upper Fulton Dam and appurtenant structures, owned by the New York State Department of Transportation, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Upper Fulton Dam at Lock Number 2 is best described by identifying the various elements of the structure from east to west across the Oswego River. Lock Number 2 of the Oswego River is located on the east bank of the Oswego River. Immediately to the west of Lock Number 2 is located Oswego Falls East Power Generating Station owned by Niagara Mohawk Power Corporation. Flow into the forebay of the power generating station is controlled through a series of sluice gates. Sluice gates consist of 9 openings, 6-1/2 feet wide by 9-3/4 feet high. The west end of the sluice gates terminate in a side channel spillway that extends upstream into the river approximately 108 feet. The upstream end of this side channel spillway forms the east abutment of a gravity concrete ogee type spillway dam which spans 208.75 feet across the Oswego River. Immediately to the west of the ogee type spillway is located a series of tainter gates which span an additional 190 feet of the river.

These tainter gates consist of 6 openings at 26 feet, 8 inches each. Immediately to the west of the tainter gate structure, there is located another series of sluice gates which control flow to the forebay of the Oswego Falls West Power Generating Station. This sluice gate structure consists of 17 openings, 9 feet, 9 inches high by 6 feet, 6 inches wide. The west abutment of the sluice gate structure is on the west bank of the Oswego River.

Both the main ogee spillway section and the side channel spillway consist of concrete overlays of the original masonry dams. The height of the concrete spillway is approximately 15 feet. The height of the weir is approximately 11 feet. Flashboards are placed on the top of the weir to a height of approximately 18 inches. The entire structure is founded on bedrock and this foundation is visible in the downstream channel. The dam is the second in a series of six dams which regulate flow in the Oswego River for use in navigation and power generation.

b. Location

The Upper Fulton Dam at Lock Number 2 is located in the City of Fulton, Oswego County, New York.

c. Size Classification

The maximum height of the dam is approximately 11 feet. The storage volume in the impoundment is approximately 3,500 acre feet based on the river channel area of 350 acres and an average depth of 10 feet. Therefore, the dam is in the Intermediate Size Classification as defined by The Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The Oswego River flows through the City of Fulton. The Oswego River is also used for navigational and recreational purposes. Therefore, the dam is in the High Hazard Category as defined by The Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the New York State Department of Transportation.

Waterway Maintenance Subdivision:

New York State - DOT
Main Office - State Campus
1220 Washington Avenue
Albany, New York 12232
Director - Mr. Joseph Stellato
(518) 457-4420

Region Three:

New York State - DOT
Syracuse State Office
333 E. Washington Street
Syracuse, New York 13202
Engineer - Mr. Leo Burns
(315) 473-8194

f. Purpose of Dam

The dam is used to regulate flows in the Oswego River for navigation use and power generation. The Oswego River is also used for recreational purposes.

g. Design and Construction History

The dam, as it originally exists, was constructed in approximately 1914. The 1914 construction was a modification of an existing masonry dam at this site.

h. Normal Operating Procedures

The facility is operated cooperatively by the New York State Department of Transportation and the Niagara Mohawk Power Corporation. The main function of the facility is to provide adequate pool elevations for navigation in the Oswego Canal. The secondary function of the facility is for power generation at the Niagara Mohawk Power Generating Facilities. The primary function of the facility, navigation, is maintaining the upstream water level at the elevation of the spillway crest. In order to maintain this level and have adequate flows for power generation, the Niagara Mohawk Power Corporation places flashboards on the dam each spring to provide sufficient impounded water during the low runoff periods. The gates which control the flow into the forebay of the power generating stations are owned and operated by the New York State Department of Transportation. These gates may be closed to shut off the flow to the generating facilities. Representatives of the New York State Department of Transportation indicate that it has been unnecessary to manipulate these gates in order to regulate the generating flow. The gates are used only to dewater the forebay channel for maintenance purposes. The tainter gates are also used to regulate flow into the downstream channel for both navigational and power generating purposes.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of Upper Fulton Dam is 5100± square miles.

b. Discharge at Dam Site

Peak discharge records at USGS gage 0424900, 11 miles downstream at Lock 7.

March 28, 1936	37,500 cfs
April 10, 1940	75,000 cfs
June 27, 1972	32,300 cfs

Computed discharges: (Tainter gates closed)

Ungated spillway, top of dam	50,000 cfs
Ungated spillway, PMF	81,900 cfs
1/2 PMF	46,800 cfs
Gated drawdown, thru Niagara Mohawk Power Plant	7,200 cfs

c. Elevation* Barge Canal Datum (U.S.G.S. + 0.99)

Top of dam	362.5
Maximum pool - PMF	366
1/2 PMF	362
Spillway crest (main)	
Nav. season with flashboard	354.05
Winter season without flashboards	352.80
Stream bed at centerline of dam	340

d. Reservoir

Length of maximum pool	48,800 ft.
Length of normal pool	48,800 ft.

e. Reservoir Area

Top of dam	350.0 acres
Spillway pool	350.0 acres

f. Dam

Type - Masonry rubble with concrete crested spillway overlay.
Length - Side channel spillway 108 ft.
Main weir 208.75 ft.
Tainter gates 252.8 ft.
Height - Varies, maximum concrete section 10.8 feet founded on graded bedrock.
Freeboard between normal reservoir and top of dam - 1.23 feet.
Top width - See plans for crest dimensions.
Side slopes - See plans for crest dimensions.

g. Spillway

Type - Crested spillway.
Length - 404.5.
Crest elevation - See above in Section (c).
Gates - 6 tainter gates, each 26.67 feet opening.
U/S channel - Reservoir.
D/S channel - River.

*Stages for flood flow conditions assumed failure of flashboards under these high heads. This has been verified with Niagara Mohawk Power Corporation.

h. <u>Regulating Outlets</u>

Tainter gates - 6 openings at 26.67 feet, crest elevation 252.8 ft.
Drawdown - Capability through powerhouse.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for evaluation of this dam has been included in this report. The information consisting of contract drawings is contained in Figures 2 through 16. No information on design of the dam was available.

2.2 CONSTRUCTION

Details regarding the construction are included in Figures 2 through 16 along with previous inspection reports on the dam by New York State Department of Transportation and New York State Department of Environmental Conservation. A record of modifications and major maintenance activities by the Department of Transportation are also included through 1965. The last recorded New York Sate Department of Environmental Conservation inspection was dated 1919.

2.3 OPERATION

No operating manual is known to exist for this structure.

2.4 EVALUATION

The information included in this report is adequate to complete this Phase I investigation. Therefore, no additional requirement for data is given at this time.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Upper Fulton Dam at Lock Number 2 was inspected on June 7, 1979 and again on June 13, 1979. The Dale Engineering Company Inspection Team was accompanied on both inspections by Richard Aldrich of the New York State Department of Transportation and Robert McCarty of the New York State Department of Environmental Conservation Dam Safety Section. The Team was accompanied by Robert Levett of Niagara Mohawk Power Corporation and John Brennan of Niagara Mohawk Power Corporation on the second inspection.

b. Dam

The first inspection was conducted while water was cresting the weir section of the dam. This inspection disclosed a horizontal joint across the face of the crested weir and deterioration of the bedrock foundation just beyond the toe of the dam. Both of these items were of concern to the inspection crew. Therefore, a second inspection was scheduled and arrangements were made to drop the water level in the impoundment so that the face of the dam and the foundations at the toe of the structure could be inspected in detail. The photographs show the condition of the face of the dam. Severe deterioration has taken place along both the horizontal and vertical joints of the concrete. Some undermining of the foundation rock has occurred near the toe of the apron, although probing under the toe of the apron did not reveal voids in this area. However, the rock key and toe is undermined. Leakage is occurring through construction joints on the side channel spillway. Weir deterioration of the abutments has also occurred. There was no apparent misalignment of the concrete structure, nor was there any displacement of the monoliths in the structure.

c. Appurtenant Structures

There is a general deterioration of the surface of the concrete in the lock structure. No seepage was found in the concrete wall of the lock structure.

The sluice gates which control flow into the forebay of the easterly power generating station are in very poor condition. The concrete walkway is severely deteriorated so that reinforcing is exposed. The wooden sluice gates were in the full up position at the time of our inspection. The operating mechanism has been removed so that the gates can be closed only with the aid of a crane. The concrete wall which separates the forebay of the easterly power generating station from the main channel of the river is severely deteriorated. Spurting leaks were noticed in this wall at elevations close to the river channel elevation.

The tainter gate structure is in operating condition. These gates were operated in order to reduce the level of the upstream pond for the second inspection. The structural steel is in fair condition throughout. It is in general need of painting. The concrete is in a deteriorated condition. Surface spalling is prevalent throughout the structure. The operating mechanisms are manually operated and consist of worm gear operators which turn a pinion gear which engages a rack for raising and lowering the tainter gates. Deterioration of the bedrock foundation in the downstream channel has taken place to a point approximately 2 feet downstream from the bulkhead between the second and third gate from the west end of the structure.

d. Control Outlet

Outlet from the impounded area is controlled by regulating the flow through the power generating stations, by the placement of flashboards, and by manipulation of the tainter gates. Drawdown of the impoundment for the second inspection was accomplished by opening one of the tainter gates.

e. Reservoir Area

The reservoir area extends approximately 9-1/4 miles upstream to another run of the river dam which performs a function similar to this facility. There are no known areas of bank instability along this course.

f. Downstream Channel

The downstream channel is formed in bedrock and is in generally good condition. However, some undermining of the bedrock has occurred close to the dam structure and tainter gates.

3.2 EVALUATION

Visual inspection reveals spurting leaks along the wall which separates the forebay of the easterly power generating station from the main river channel. This wall is generally in poor condition with seepage noted along the surface. The concrete surfaces of the main spillway and side channel spillway are in deteriorated condition. Severe deterioration has taken place along horizontal and vertical joints. The foundation of the dam shows some sign of undermining in the bedrock. This condition could worsen with time. The tainter gates are in generally good condition, although surface spalling of the concrete is prevalent throughout the structure. No major deformation of the alignment of any of the structures was noted in the visual inspection. The tainter gates and control structures are in operating condition. The sluice gates controlling the flow into the forebay of the easterly power station are inoperable and severely deteriorated.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The primary operational procedure is to control water level in the impoundment upstream from the dam for navigational purposes on the Oswego River. A secondary operational procedure is the utilization of the river for power generating purposes. Total operational procedure is under the control of the New York State Department of Transportation. Six tainter gates, 26.67 feet each, are located on the western portion of the dam. Access to the gates is obtained through the Niagara-Mohawk facility. The gates are manually operated with a rack and pinion device located next to each gate. Directives are given by the Region 3 Office to the lock tender to regulate flows via the tainter gates. The operation of the tainter gates and water level control through the use of hydro turbines is done in cooperation with Niagara Mohawk Power Corporation.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam, tainter gates, and sluice gates are controlled by the New York State Department of Transportation. Flashboards are placed on the dam by Niagara Mohawk Power Corporation. Once every two years a visual inspection is made of the structure by a New York State Department of Transportation inspector and a report on the condition of the structure is filed at the Department of Transportation Central Office in Albany. Maintenance to the structure is scheduled on a priority basis as a result of the biannual inspection. Major maintenance items, such as repair of the deteriorated spillway surface condition, have not been performed.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the entrance to the forebay of the power generating station are under control of the New York State Department of Transportation. These gates are operated infrequently and are used mostly to accommodate Niagara Mohawk when dewatering of the forebay is required. The tainter gates are also maintained by the Department of Transportation.

4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenant structures are inspected at regular intervals. Maintenance on the control gates has been adequate to maintain them in operating condition, although additional maintenance is required. Maintenance on the structure has been minimal in recent years, as evidenced by the severely deteriorated conditions of the

concrete. The sluice gates serving the easterly power generating station are presently inoperative. However, they could be made operative through the use of a crane. The deteriorated condition of concrete indicates that past maintenance has not been adequate.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Oswego River Basin, located in central New York State, has a drainage area of approximately 5,100 square miles. It flows northerly discharging into Lake Ontario in the City of Oswego. The completed river system includes the seven Finger Lakes, Oneida Lake, Onondaga Lake, the Barge Canal, and outlets from the lakes to the canal. The basin's major rivers, the Seneca, Oswego, and Oneida are incorporated into the Barge Canal System as are Oneida, Cayuga, and Seneca Lake. All of the lakes have regulated outlets except Onondaga.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. Where the structure is integrated with hydropower and navigation lock facilities, interrelationships from a hydrologic standpoint have been evaluated. In general, in this screening analysis, control structures and gates used for the latter two purposes are not considered as flood control devices.

Different scenarios of partial dam failures, i.e., tainter gates or monolith failures, are beyond the scope of this analysis due to the fact that the dam is a run-of-river facility and the downstream dam break flood wave analysis is multi-dimensional. From a commentary viewpoint, the dam inspection team concludes that a partial failure under normal conditions would potentially be a navigational hazard rather than an inundation hazard.

The dam's stability and flood discharge capacity is assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration runoff of a specific location that is considered reasonably possible for a particular drainage area. Since this dam is in the Intermediate Size Category and is a High Hazard, the guidelines criteria (Ref. 1) require that the dam be capable of passing one-half the Probable Maximum Flood.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions based on experience and existing data, were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF.

An HEC-1 computer model for the basin was obtained from the New York State Department of Environmental Conservation. This model has been developed over the years through a number of study efforts by the De-

partment with assistance from the U.S. Army Corps of Engineers, Buffalo District. The model was calibrated by D.E.C. to a peak flood event, Hurricane Agnes, June 20-26, 1972. The dam investigation team briefly reviewed these findings. It then obtained the flood records at USGS gage at Lock 7 near the dam sites, and within the constraints of this scope of work, verification of the existing model was obtained (See Figure C-8). The sub-basin designations, 6-hour unit hydrographs, routing methods, and loss rates for the model (those used for Hurricane Agnes) were all adopted. The model was recorded for the HEC-1DB PMF analysis. In reviewing the regulated outlet rating curves, it was determined the high discharges for this PMF analysis were not adequately described. However, these flows were accounted for by increasing the modified Puls Method rating curves for these outlets (See Appendix C). In one instance, a rating curve developed for one of these outlets and used by the inspection team on a previous inspection report, was substituted into the model.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB was utilized to evaluate the PMF hydrology. The Probable Maximum Precipitation (PMP) was 21.5 inches, Hydrometeorological Report (HMR #51) for a 24-hour duration, 200 square mile basin. Loss rates used from the D.E.C. model were in the range of 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. Actual values used were those calibrated during the storm of Hurricane Agnes, June 20-26, 1972. Only one multi-plan analysis (.2, .4, .5, .6, .8, 1.0 PMP) was performed; it distributed the rainfall over the 5,100 square mile area. If further in-depth investigations are made, it should attempt to center the storm for critical flows since the major sub-basins lend themselves to such an analysis and a potential for greater runoff. This work effort would be a refinement of the analysis provided herein.

This dam investigation at Lock No. 2 is one of six dam investigations on the Oswego River. These dams are located at Locks 1,2,3,5,6, and 7. The hydrologic analysis provides flood flows up to Lock 1 at Phoenix, New York (Lock 7 is near the mouth of the river at Oswego). It assumes the discharges from the 6-hour time increment PMF hydrographs will effectively be the same for all the dam sites since the upstream runoff area is over 5,000 square miles and the downstream runoff area is about 100 square miles. The results of the analysis have been compared to the USGS gage discharge-frequency plot results at Lock 7 (See Figure 18).

5.3 SPILLWAY CAPACITY

The spillway is a combination crested spillway system and tainter gate system. A side channel spillway, 108 feet in length on the east side of the river, connects to a 208.75 foot main spillway crested weir across the eastern half of the dam. Six tainter gates, each opening to 26.67 feet with their concrete pier supporting the system, comprise the western side of the dam across the river having a total length of 252.8 feet. The tainter gates each operate with a manually operated rack and pinion device.

The spillway system was evaluated with the tainter gates in both the opened and closed positions. The analysis performed within the limits of this investigation indicates that, with the tainter gates closed, the top of dam capacity is 50,000 cfs which is slightly greater than the 1/2 PMF discharge of 46,800 cfs. With the gates open, the top of dam capacity is approximately 10 percent greater. From the range of 1/2 PMF to PMF flood flows, submergence with the tainter gate occurs and PMF stages are calculated to be slightly lower with the gates actually closed. (This analysis should be defined in follow-up work.)

Certain plans for the six dams, some of which were constructed under a single contract, call out the original design flood as 30,000 cfs. Modifications have been made to the dam structure at Lock 2 to increase the top of dam capacity to 50,000 cfs with the tainter gates in a closed position. The gage at Lock 7 downstream has recorded no events greater in magnitude than the total dam capacity. The PMF flood magnitude was computed at 81,900 cfs while the 1/2 PMF flood was computed at 46,800 cfs.

SPILLWAY CAPACITY

	Without Flashboards	
	Discharge	Capacity as % of PMF
PMF	81,900 cfs	61%
1/2 PMF	46,800 cfs	107%

The flashboard system, maintained by Niagara Mohawk Power Corporation, is designed to fail when overtopping is in excess of 1 to 1-1/2 feet.

5.4 RESERVOIR CAPACITY

The reservoir storage at top of dam on this navigable river, up to the next dam at Lock 1, was estimated based on the river dimensions. The length of river is 48,800 feet; the width of river varies between 300 and 500 feet. At top of dam, the flood storage is approximately 3,500 acre feet.

5.5 FLOOD OF RECORD

Floods are measured at USGS gaging station 04249000 at Lock 7. The gage datum is 246.0 ft.; the drainage area of the gage is 5121 sq. mi.; the period of record is from 1934 to present. The records through 1974 show that four events have had flood discharges in excess of the dam's original design flood, but none being greater than existing top of dam discharge capacity.

March 28, 1936	37,500 cfs
April 10, 1940	35,000 cfs
June 27, 1972	34,300 cfs
April 4, 1960	31,200 cfs

A Corps of Engineers' investigation entitled Post Hurricane Agnes, June 20-26, 1972, Investigation indicated only $14,000 occurred in damages in the reach from Lock 1 through Lock 7 to Lake Ontario.

5.6 OVERTOPPING ANALYSIS

The HEC1-DB analysis indicates that the dam would be overtopped as follows:

	OVERTOPPING IN FEET
PMF	3.5
1/2 PMF	None

According to this analysis, the dam has not been overtopped to date since the top of dam discharge capacity is around 50,000 cfs. It would not be overtopped with a 1/2 PMF flood.

No significant effect due to overtopping of the dam would be realized downstream. Some damage would likely occur at the lock and hydro generation facility.

5.7 EVALUATION

The spillway is inadequate to pass the Probable Maximum Flood (PMF) without overtopping the dam. However, based on the Corps of Engineers' Screening Criteria, it is not considered seriously inadequate since the spillway will pass the 1/2 PMF without overtopping the dam.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The main dam structure consists of a main dam/spillway and tainter gate structure extending across most of the river. The east end of the main dam section joins a short dam/spillway section extending in the direction parallel to the river, and utilized to direct flow into the forebay of the power plant located on the east side of the river. The navigation lock is situated east of the dam and power stations. The dam facility was observed when the upstream water level had been drawn down, making the dam's downstream face accessible for inspection. Under normal operation, the dam sections function as spillways. The upstream side of the dam sections remained submerged at the time of the field inspection.

Observations indicate the dam structure retains stability at this time with no indication of misalignment, displacement or other structural movement.

Design drawings available for review, dated 1909 and included in Figures 2-16, indicate the present main dam section is composed of a masonry core (presumably an older dam structure at this location) and a concrete cover (presumably utilized to increase the height and section of the original dam to obtain the present configuration). At this time, virtually the entire downstream dam face has experienced deterioration, some quite extensive. A horizontal joint at about the dam's mid height and extending the complete length of the dam (probably a construction joint) is widening in the facial zone from deterioration and erosion of the concrete. Seepage occurs through this joint.

At the east end of the main dam/spillway section, the concrete and masonry corner structure (used to join the main dam to the short transverse section leading to the power plant forebay) is severely deteriorated and undermined. The concrete dam/spillway section leading to the forebay is experiencing surface deterioration but appears stable.

The river's bedrock surface immediately downstream of the dam and tainter gate structure forming the western segment of the dam facility was observed to be jointed and layered. Loose blocks of bedrock lie on the river floor. Erosion and undermining of the upper rock occurred across much of the river spillway area with the erosion/undermining working back dangerously close to the dam structure at one location about mid-length of the main dam/spillway section and at another location near a tainter gate pier.

The power plant and its forebay are located on the downstream side of the dam/spillway structure. A layed-up stone wall separating the forebay and river appears structurally stable, but through-the-wall leakage, some extensive, occurs at several locations.

Concrete in the sluice gate structure, the entry to the power plant's forebay, is suffering varying degrees of deterioration. The concrete piers and counterbalances for the tainter gates comprising the western segment of the dam facility similarly show varying degrees of surface deterioration.

At the navigation lock, concrete in the gate lock structure and lock walls have experienced varying degrees of deterioration, some severe, but the various structural segments retain stability.

b. <u>Geology and Seismic Stability</u>

The Upper Fulton Dam, in the Oswego River drainage basin, is located within the Ontario Lowland which is part of the Central Lowland Province.

According to the 1915 Dam Report, the dam was sited on solid rock. Outcrops observed in the vicinity of the dam show a variety of rock materials of variable durability and resistance (see geologic stratigraphic section 1). A three foot thick cap rock, whose beds average three inches in thickness, is a tough, grayish to reddish, well cemented, medium-to-coarse grained sandstone to pebbly sandstone which is underlain by one to two inches of reddish conglomerate to pebbly sandstone. Beneath the conglomerate is a seven inch layer of thinly laminated, very friable, highly ferruginous, fine-grained sandstone. Below this friable layer, to the river bed, is at least a five foot thick section of strongly cross-bedded, thinly laminated, grayish and reddish fine-to-medium grained sandstone. Dip of the outcrops, disregarding the cross-bedded units, is less than 1° to the south.

The seven inch ferruginous layer referred to is apparently, as seen in the field, a weak material that weathers and erodes easily. It readily disintegrates and undercuts the overlying more resistant cap rock. The underlying cross-bedded material also erodes easily although not to as great an extent as that of the ferruginous zone; however, the thinly laminated nature of the beds makes it less resistant than the cap rock above. In several places along the stream, below the dam, the cap rock has collapsed due to undermining, including up to the dam apron.

Rock units exposed here may be either all Grimsby Sandstone of Lower Silurian age but the cap rock may possibly be the Kodak Sandstone of Middle Silurian age overlying Grimsby. Rock types are somewhat similar and the literature indicates some confusion concerning identification and terminology.

Bedrock is well-jointed with several sets prominent; orientations, all with near vertical dips are N40-50W, N35E, and N65E. Orientation of the dam concrete-apron, downstream edge is N85W and approximately parallel to the dam crest.

According to the 1978 Inspection Report, which contains the original plans of 1909, the plans indicate that all holes (presumably joints in rock) along the toe and extending 10 feet from the toe are to be concreted. No grout was noted downstream of the toe in the present investigation. Even if grouted, the very friable nature of the ferruginous, seven-inch layer and the relative ease of erosion of the lower cross-bedded unit could lead to undermining of the apron. Cap rock collapse is apparently moving rapidly upstream toward the dam apron in at least one area and toward the pier of the second gate of the tainter gate structure near the west side of the river.

There are no known faults or shear zones in the vicinity of the dam according to the New York State Geologic Map (1970). The Preliminary Brittle Structures Map of the New York State Geologic Survey (1977) indicates a possible fault zone, based on drill hole data, located about 9 miles north of the dam.

The Seismic Probability Map indicates the area as being in a Zone 2 designation. No earthquake activity has been recorded in the vicinity of the dam. The closest earthquake, as well as the largest (intensity IV, Modified Mercalli Scale), occurred in 1954 about 24 miles southwest of the dam. Several other minor earthquakes have occurred in the region, none closer nor more recent than that of 1954.

c. Stability Evaluation

Design drawings available for review show plan layout and cross-sections for the various structural elements comprising the dam-lock facility, but do not include information on the properties of the dam and foundation materials, nor stability analysis. In the present study, stability evaluations have been performed for the main dam section. Actual properties of the dam's construction materials and foundation rock were not determined as part of the study; where information on properties were necessary for computations but lacking, assumptions felt to be practical were made. The stability computations assumed a dam cross-section based on dimensions indicated by the plans included in this report. The analysis also assumed the dam section to be a monolith possessing necessary internal resistance to shear and bending occurring as a result of loading. It should be considered that in areas where deterioration has occurred the section dimensions would be less than indicated by the plans, with some adverse effect on the dam's structural strength expected.

The results of the stability computations are summarized in the table below. The stability analysis are included in Appendix D.

RESULTS OF STABILITY COMPUTATIONS

	Loading Condition	Factor of Safety* Overturning	Factor of Safety* Sliding**	Location of Resultant*** Passing through Base
(I)	Water elevations at normal operating levels, uplift on base plus 7.5 kip per lineal foot ice load acting.	1.06±	13±	0.05b
(II)	Water elevations at 1/2 PMF levels, uplift acting on base as computed for normal operating conditions.	1.35±	15±	0.22b
(III)	Water elevations at PMF levels, uplift acting on base as computed for normal operating conditions.	1.24±	12±	0.16b

*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

**As determined applying the friction-shear method.

***Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

The analysis indicate unsatisfactory stability values against overturning when the dam is subject to forces possible during normal operations (including ice loading), the 1/2 PMF and full PMF conditions according to Corps of Engineers' evaluation criteria. This occurs when the resultant of forces acting on a dam is located outside of the middle third of the base, tensile stresses would develop in the dam section, a condition which is structurally undesirable.

Critical to the analysis and resulting indication of stability are the items of uplift water pressures acting on the base of the dam and the permeability of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on a full headwater hydrostatic pressure acting on the dam's upstream corner, and a zero tailwater hydrostatic pressure acting on the dam's downstream corner. Uplift pressures were assumed to vary linearly between the dam's upstream and downstream corners, and act upon 100 percent of the dam base. Uplift, as computed for the normal operating condition, was also assigned for the flood conditions studied, it being assumed that uplift pressures would not increase significantly over a relatively short flood stage time period because of expected low foundation rock permeability for each case studied. The resulting uplift force represents a condition that is significant in arriving at the computed low factors of safety against overturning.

The erosion and undermining taking place in the river bedrock immediately below the dam structure is a serious occurrence which is dangerously close to causing loss of some areas of the dam's foundation. A program to study and implement means of sealing and protecting the susceptible rock zones requires priority. The program should extend to investigating the rock strata upstream of the dam, and the rock underlying the dam, for possible need of attention.

Repair of deteriorated concrete and joints should be accomplished for the dam spillway section and abutment area to prevent progressive deterioration and adverse structural affects. The dam's upstream face should be investigated to ascertain the need for maintenance.

Deteriorated concrete in the dam's gate structures should be rehabilitated. Similarly, repairs to the leaking forebay wall should be undertaken to keep the condition from worsening.

Necessary concrete repairs for the lock facility should be accomplished to prevent further deterioration and possible adverse structural effect on other components of the lock facility.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

This Phase I inspection of Upper Fulton Dam at Lock 2 did not indicate conditions which constitute an immediate hazard to human life or property. However, the dam's spillway surface is very deteriorated and could develop into a hazardous condition at some time in the near future. The dam would not be overtopped by 1/2 PMF flood and can safely discharge 61 percent of the PMF. Therefore, the spillway is not considered seriously inadequate, based on the Corps of Engineers' screening criteria. Additional structural stability analysis is warranted according to the Corps of Engineers' criteria for stability, since the resultant force from each of the loading cases analyzed falls outside the middle third of the dam section. The additional analysis should include borings for determining uplift pressures, to evaluate subsurface conditions, and to evaluate the dam's concrete.

The following safety assessments are based on the Phase I visual examination, analysis of hydrology and hydraulics, and structural stability:

1. The stability computations indicate that at the spillway section, the location of the resultant force passing through the base is not in the middle third of the base for the loading conditions for ice, 1/2 PMF and the PMF.

2. The entire downstream face of the main weir and side channel spillway has experienced extensive deterioration. A horizontal joint at the spillway's mid-height and extending the complete length of the dam is widening in the facial zone from deterioration and erosion of the concrete. The side channel crested spillway is severely eroded and a depression at the top of the crest has occurred. Both spillway sections have seepage occurring along the construction joints.

3. The corner of the main weir and side channel spillway is severely deteriorated and undermined.

4. The river's bedrock surface immediately downstream of the dam, and the tainter gate structure forming the western segment of the dam facility were observed to be jointed and layered. Loose blocks of bedrock lie on the river floor. Erosion and undermining of the upper rock is occurring across much of the river spillway area with erosion/undermining working back dangerously close to the dam structure at one location near mid-length of the main weir and at another location near a tainter gate pier.

5. The stone masonry wall on the river side of the east bank hydro generating intake channel has through-the-wall leakage, some extensive, occurring at several locations.

6. Concrete work on the sluice gate structure to the power plant intake channel (forebay area) has severe deterioration and the gates are inoperable.

7. The concrete piers and counterbalances for the tainter gates have varying degrees of surface deterioration.

8. The navigation lock, concrete in the gate lock staircase, and lock walls have experienced varying degrees of deterioration, some severe.

b. Adequacy of Information

The information available is adequate for this Phase I inspection purpose. Design and construction information is limited to construction plans.

c. Urgency

The effects of the deteriorated concrete and bedrock at the site on the structural integrity of the dam and appurtenant structures needs to be evaluated. Further structural investigation of these items should be undertaken immediately and completed within one year from notification. Upon completion of the investigation phase, construction should commence and the remedial work should be completed within two years of notification.

d. Need for Additional Information

To prevent the development of potentially hazardous conditions, stability and subsurface investigations should be performed to determine the structural condition of the spillways and the bedrock beyond both the main spillway and the tainter gates.

7.2 RECOMMENDED MEASURES

a. Results of the aforementioned stability analysis and subsurface investigations will determine the remedial measures required to obtain adequate dam stability and foundation stability.

The following improvement needs have been identified:

1. Repair the spillway system. The deteriorated concrete should be removed prior to resurfacing the spillway.

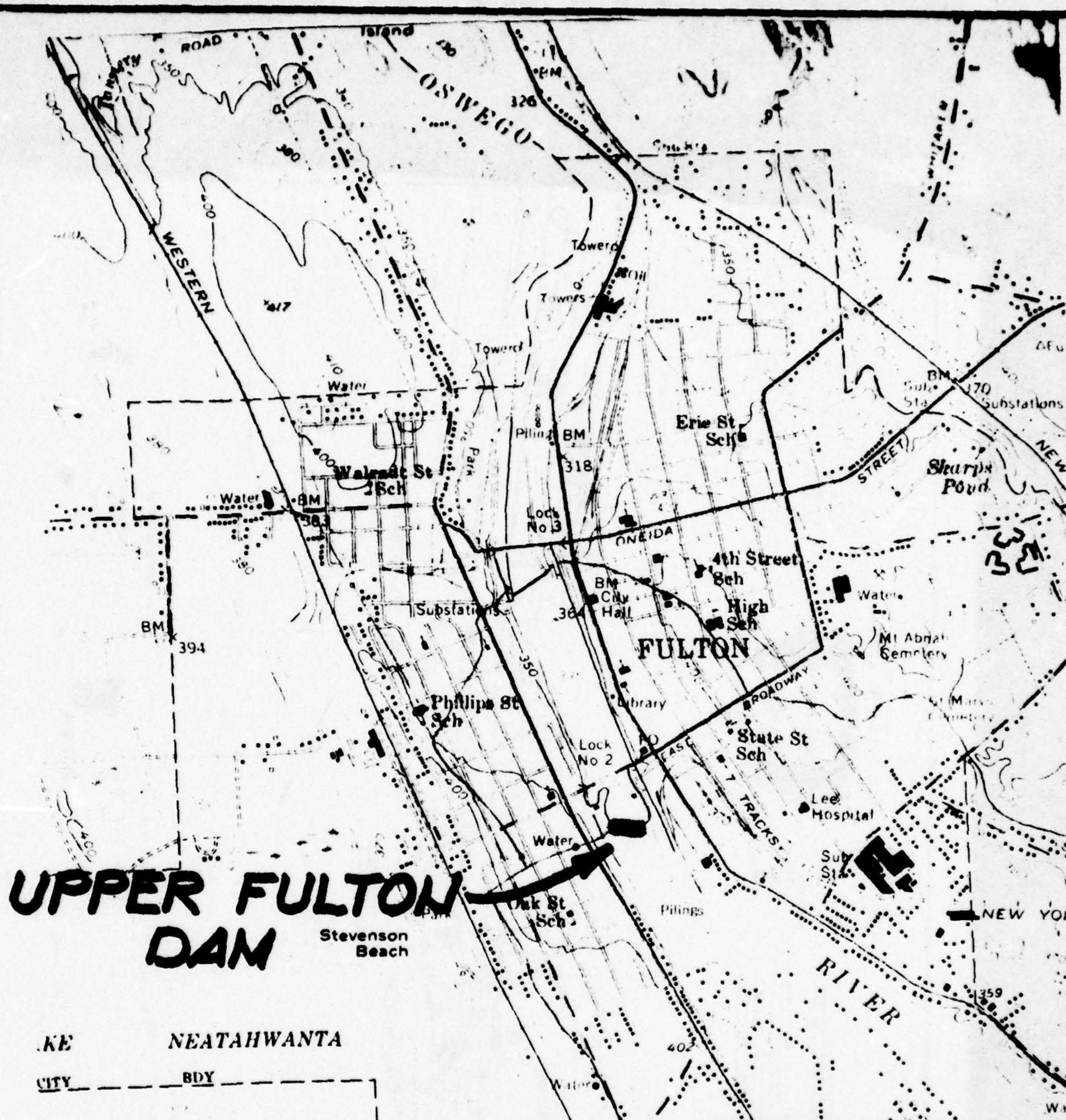
2. Repair the corner of the main weir and side channel spillway.

3. Repair the subsurface condition under the dam and below the dam. Grouting to improve the dam's subsurface condition may be required.

4. Repair the stone masonry riverside wall of the east bank generator station to eliminate leakage and seepage. Repair the concrete capping on top of the wall.

5. Replace the sluice gates controlling the forebay of the east bank generating station (gates must be operatable in order to accomplish item (d) above.

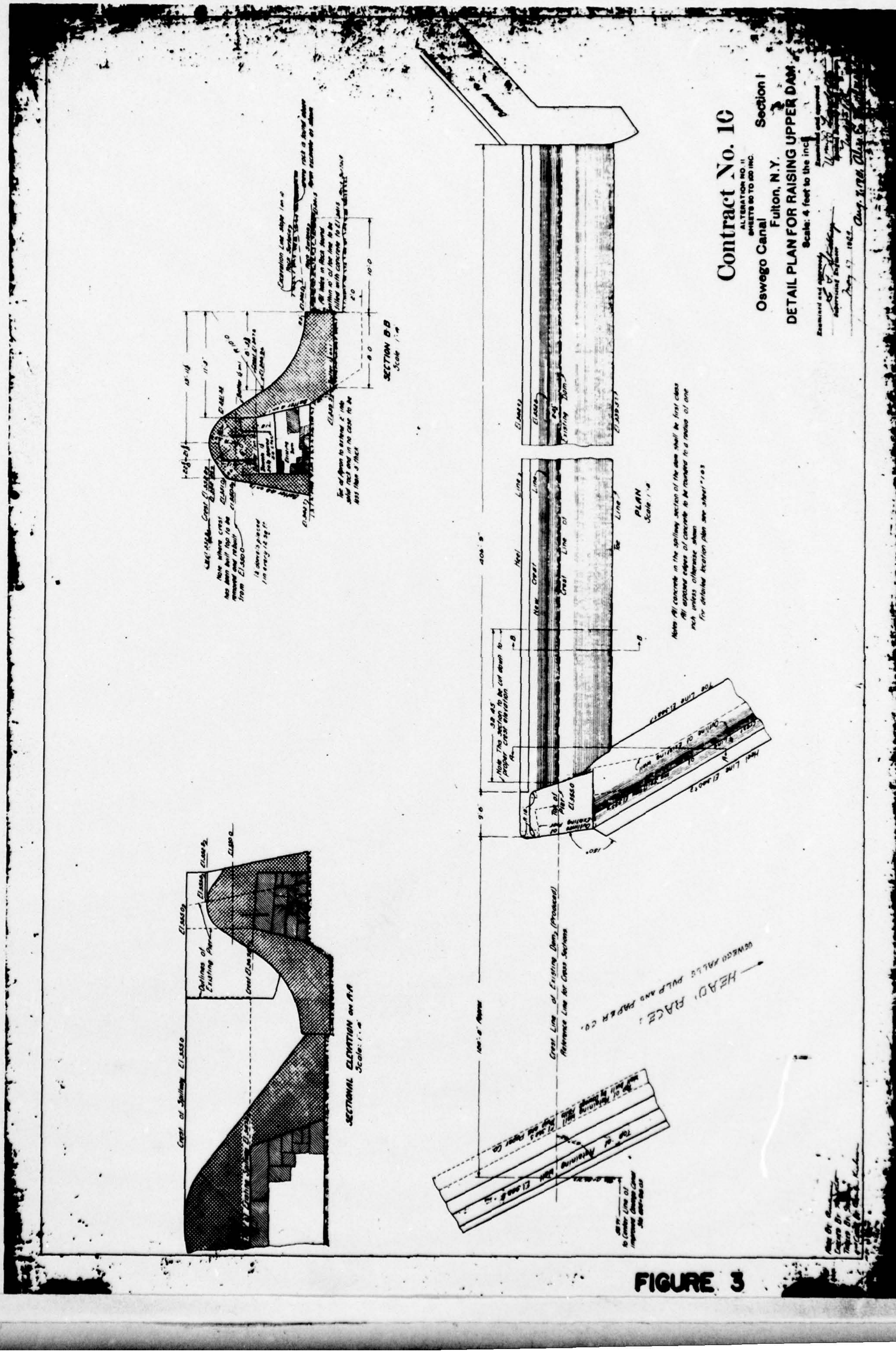
6. Repair the concrete at the tainter gates.



VICINITY MAP

LOCATION PLAN

FIGURE 1



Contract No. 10
Oswego Canal
Section I
Fulton, N.Y.
DETAIL PLAN FOR RAISING UPPER DAM
Scale: 4 feet to the inch
SECTIONAL ELEVATION on A-A
SECTION B-B
PLAN
HEAD RACE
OSWEGO FALLS PULP AND PAPER CO.

FIGURE 3

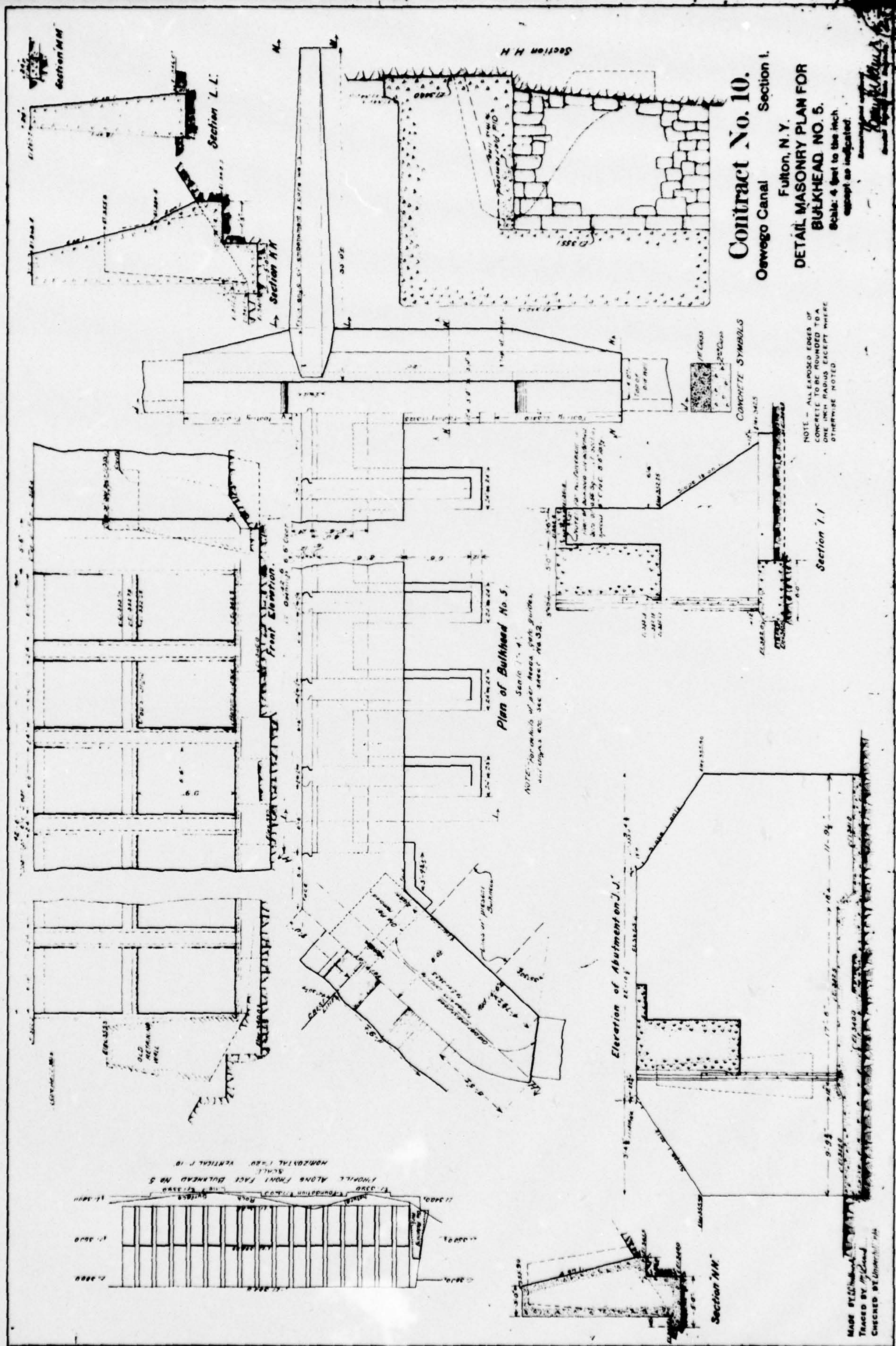

Contract No. 10.
Oswego Canal
Section I.
Fulton, N.Y.
DETAIL MASONRY PLAN FOR
BULKHEAD NO. 5.
Scale: 4 feet to the inch
except as indicated.
Plan of Bulkhead No. 5
Front Elevation
Section 'L L'
Section H H
Section 'I I'
Elevation of Abutment on 'J J'
Section 'KK'
CONCRETE SYMBOLS
NOTE - ALL EXPOSED EDGES OF CONCRETE TO BE ROUNDED TO A ONE INCH RADIUS EXCEPT WHERE OTHERWISE NOTED

FIGURE 4

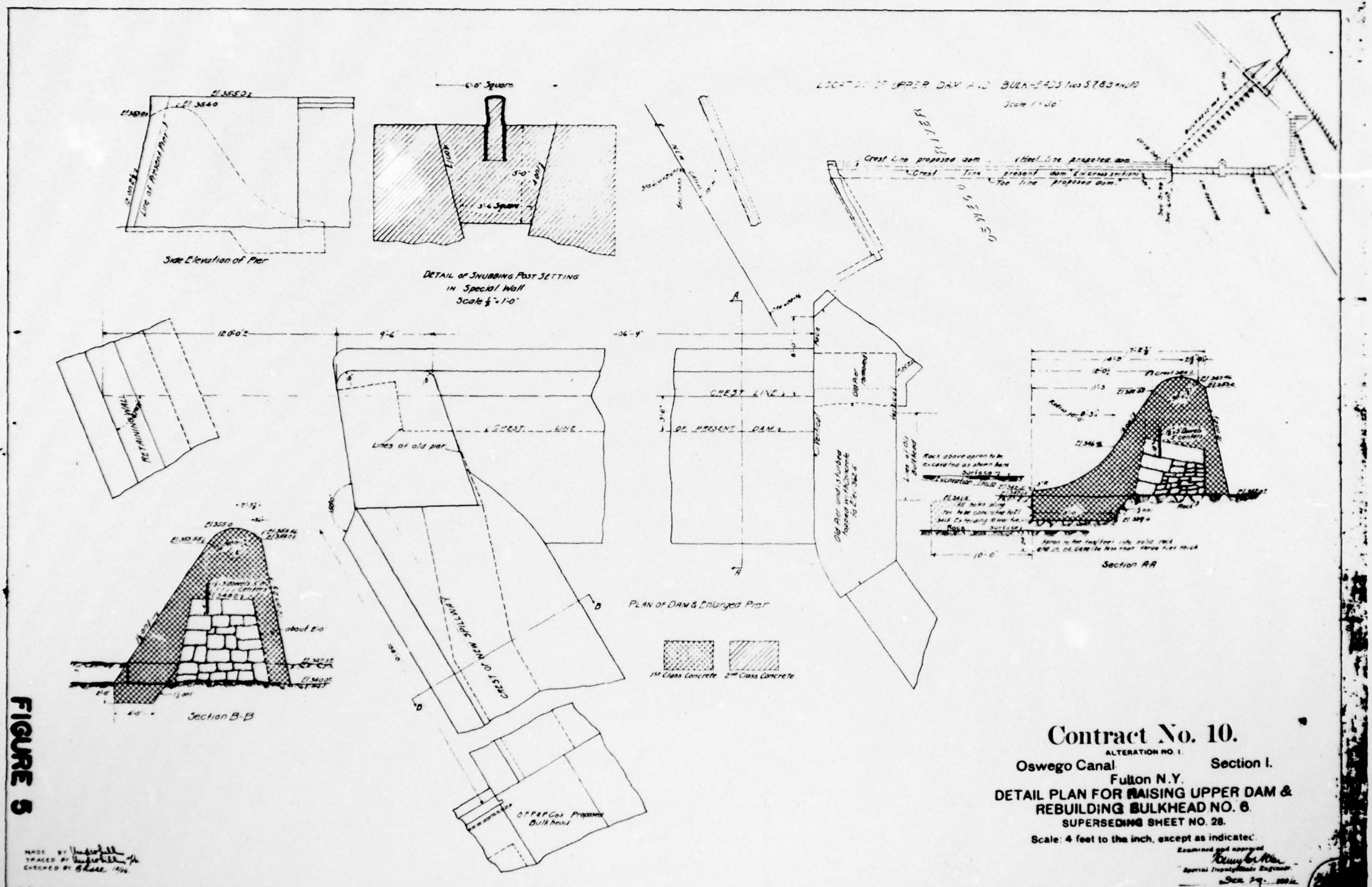


FIGURE 5

Contract No. 10.

ALTERATION NO. 1

Oswego Canal — Section I.

Fulton N.Y.

DETAIL PLAN FOR RAISING UPPER DAM & REBUILDING BULKHEAD NO. 6.

SUPERSEDING SHEET NO. 28.

Scale: 4 feet to the inch, except as indicated.

Examined and approved

Special Deputy State Engineer

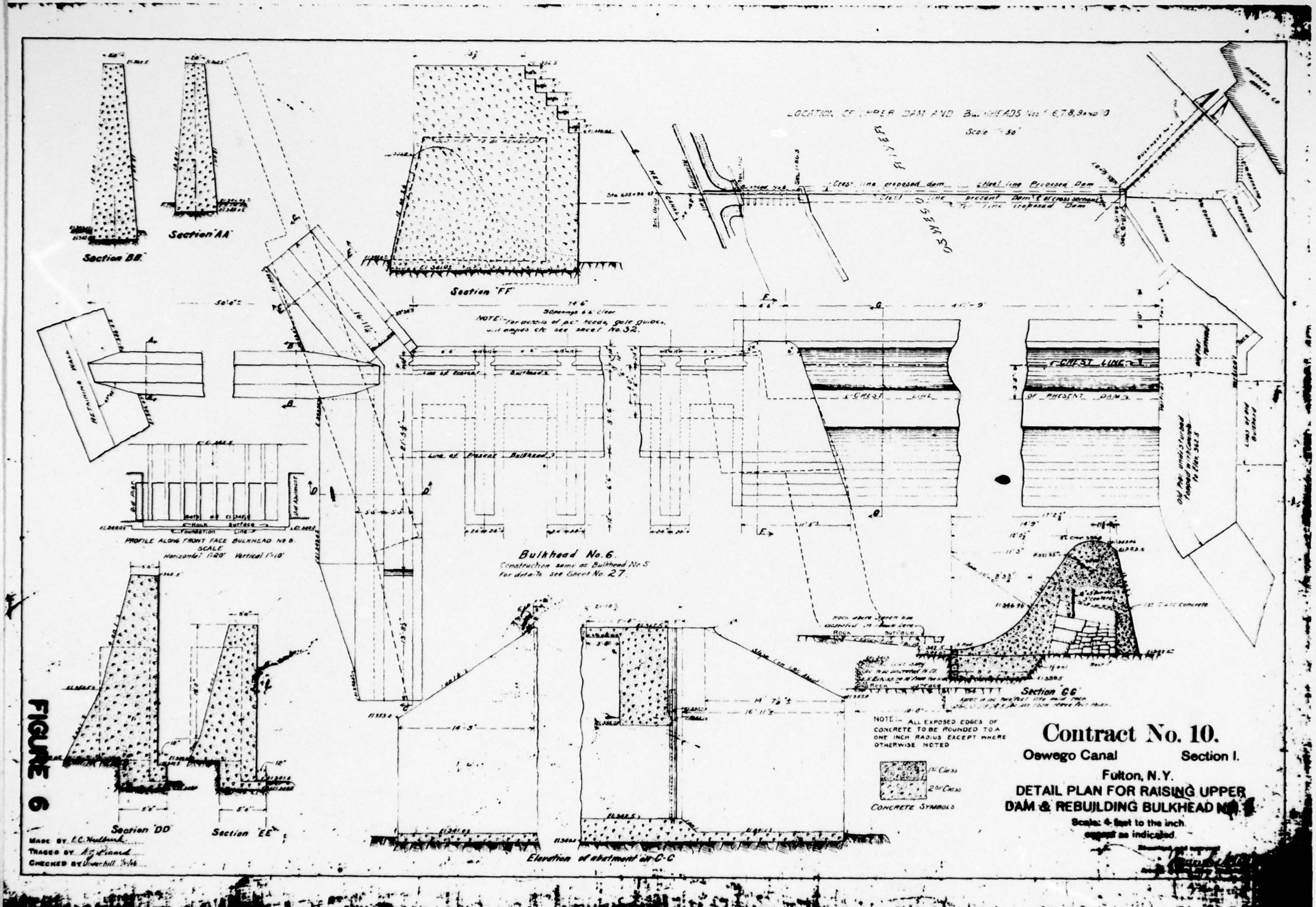

Contract No. 10.
Oswego Canal
Section I.
Fulton, N.Y.
DETAIL PLAN FOR RAISING UPPER DAM & REBUILDING BULKHEAD
Scale: 4 feet to the inch.
LOCATION OF UPPER DAM AND BULKHEADS Nos 6,7,8,9 and 10
OSWEGO RIVER
NEW CANAL
Retaining Wall
Crest line proposed dam
Heel line Proposed Dam
Section BB
Section AA
Section FF
Section DD
Section EE
Section GG
Bulkhead No. 6
Construction same as Bulkhead No 5
For details see Sheet No 27.
NOTE: For details of gates, gate guides, angles etc see sheet No. 32.
Line of Present Bulkhead
CREST LINE
CREST LINE OF PRESENT DAM
PROFILE ALONG FRONT FACE BULKHEAD No 6.
RETAINING WALL
Elevation of abutment at C-C
1st Class Concrete
NOTE:- ALL EXPOSED EDGES OF CONCRETE TO BE ROUNDED TO A ONE INCH RADIUS EXCEPT WHERE OTHERWISE NOTED
1st Class
2nd Class
CONCRETE SYMBOLS
MADE BY
TRACED BY
CHECKED BY

FIGURE 6

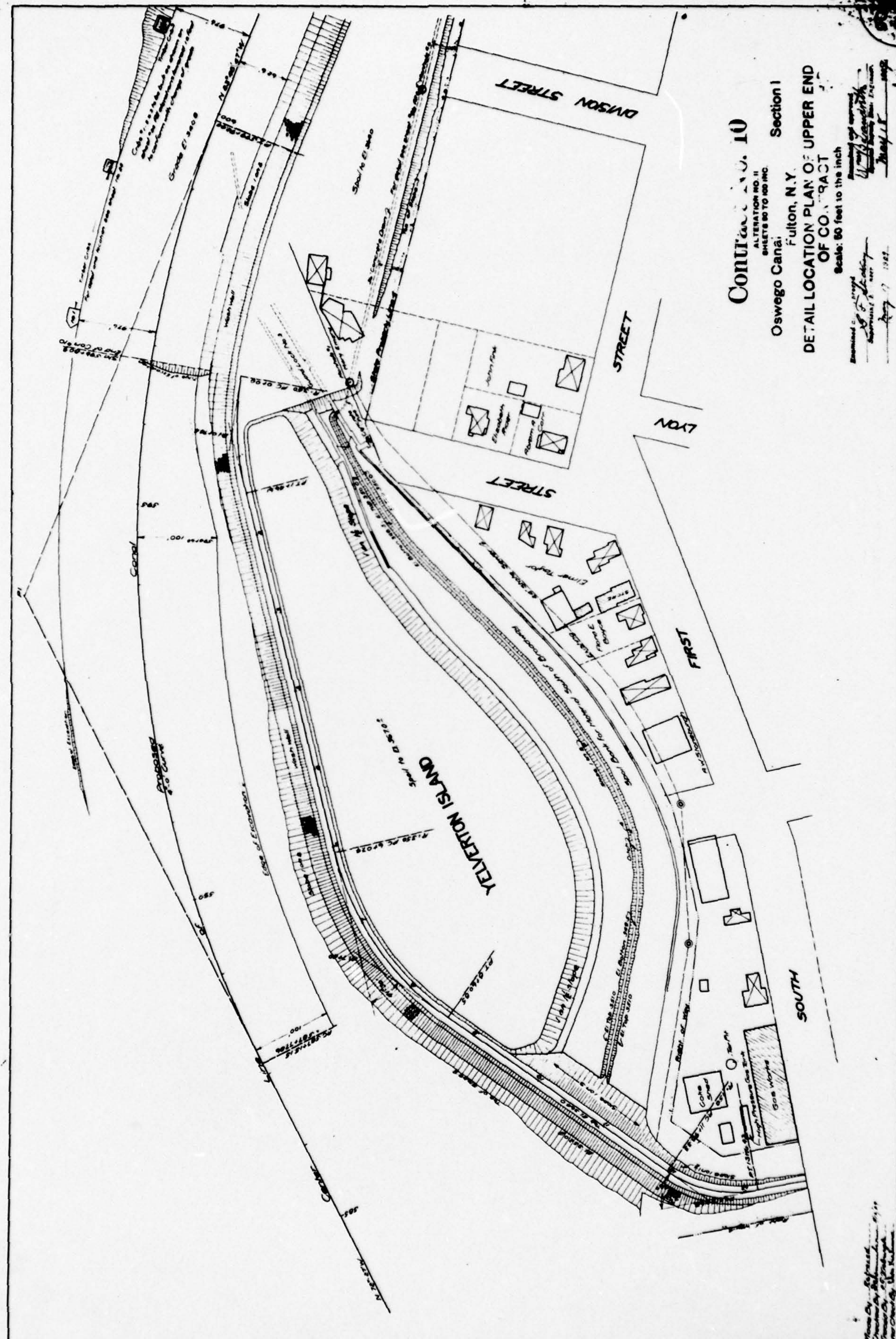
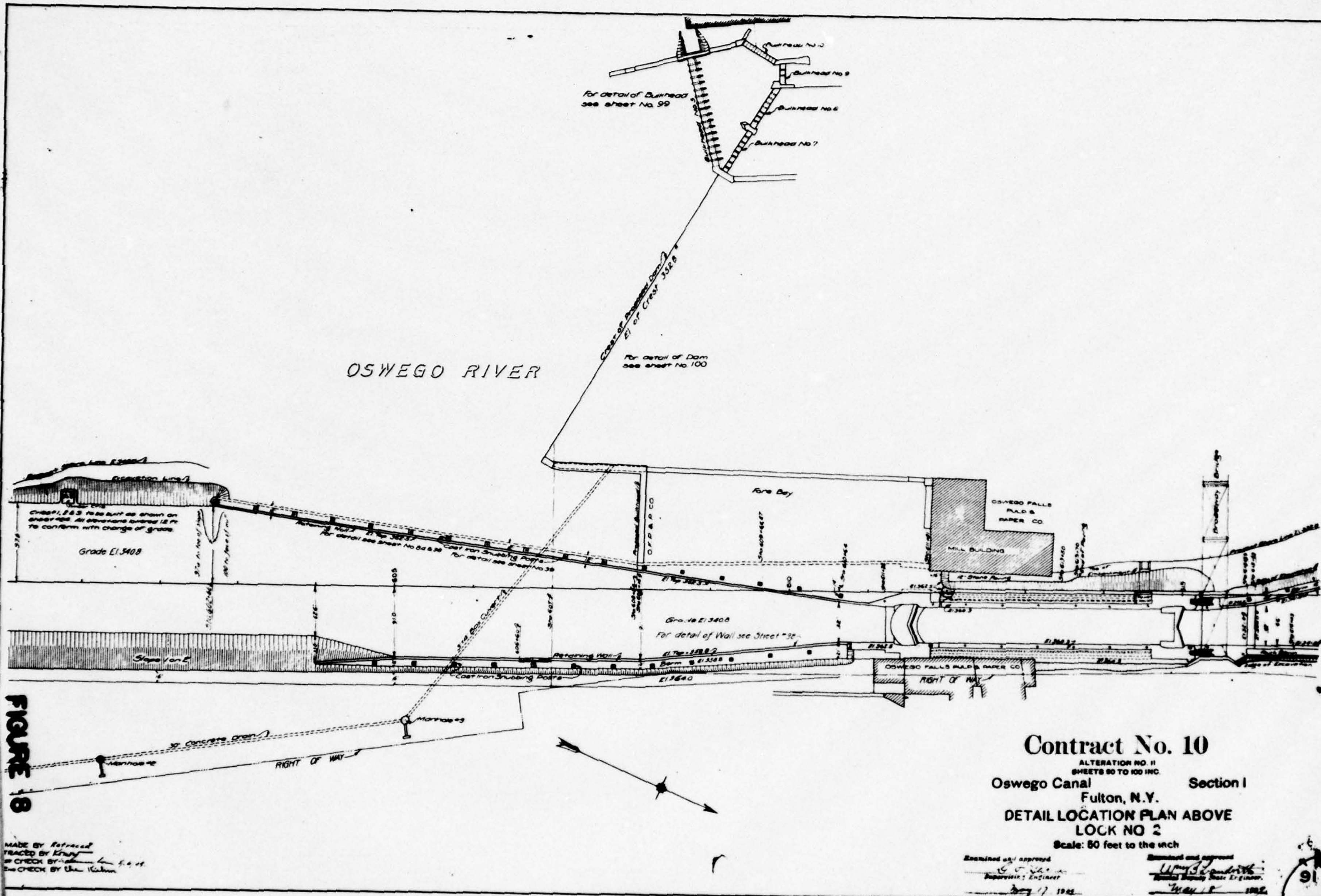

Contract No. 10
ALTERATION NO. II
SHEETS 90 TO 100 INC.
Oswego Canal Section I
Fulton, N.Y.
DETAIL LOCATION PLAN OF UPPER END OF CONTRACT
Scale: 50 feet to the inch
DIVISON STREET
LYON STREET
FIRST STREET
SOUTH
YELVERTON ISLAND
Gas Works
Canal
Proposed

FIGURE 7



For detail of Bulkhead see sheet No. 99
Bulkhead No. 9
Bulkhead No. 6
Bulkhead No. 7
El. of Crest 352.8
For detail of Dam see sheet No. 100
OSWEGO RIVER
Fore Bay
OSWEGO FALLS PULP & PAPER CO.
MILL BUILDING
O. F. P. & P. CO.
Grade El. 340.8
Grade El. 340.8
For detail of Wall see Sheet No. 98
Retaining Wall
Berm
Cast Iron Snubbing Posts
Slope 1 on 2
OSWEGO FALLS PULP & PAPER CO.
RIGHT OF WAY
Manhole
30" Concrete Drain
RIGHT OF WAY
Contract No. 10
ALTERATION NO. II
SHEETS 90 TO 100 INC.
Oswego Canal
Section I
Fulton, N.Y.
DETAIL LOCATION PLAN ABOVE
LOCK NO 2
Scale: 50 feet to the inch
Examined and approved
Examined and approved
91
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

FIGURE 18

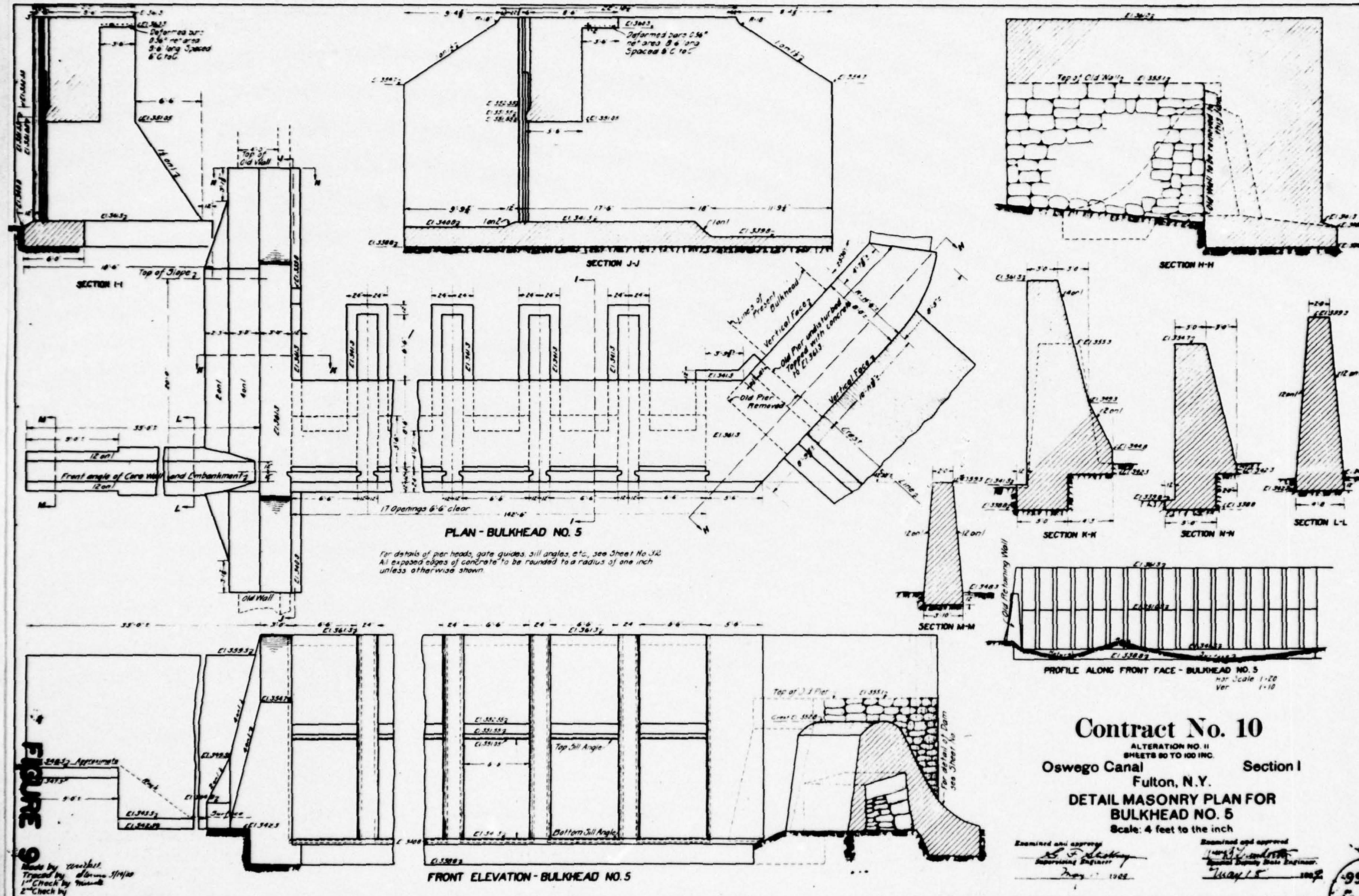
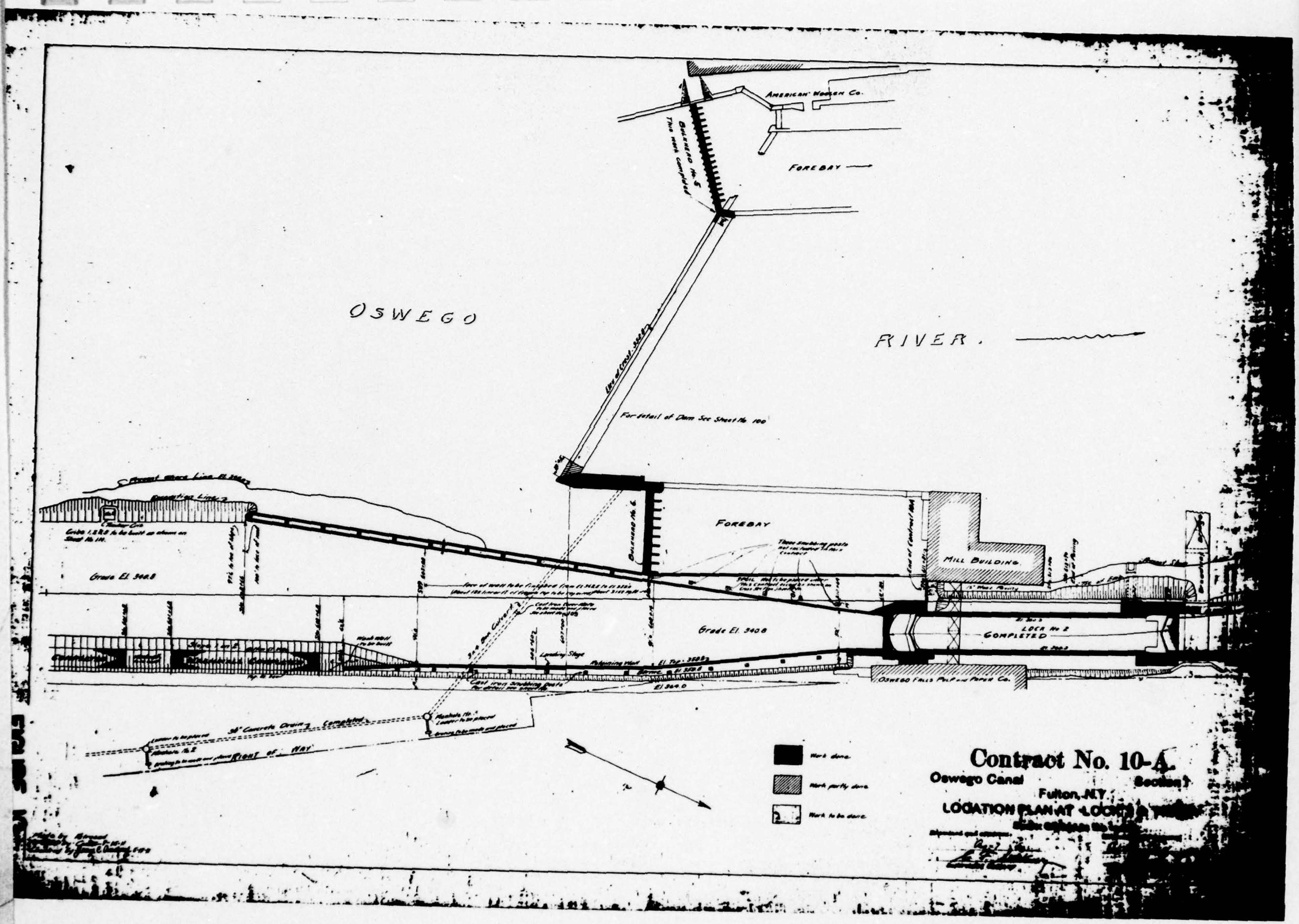
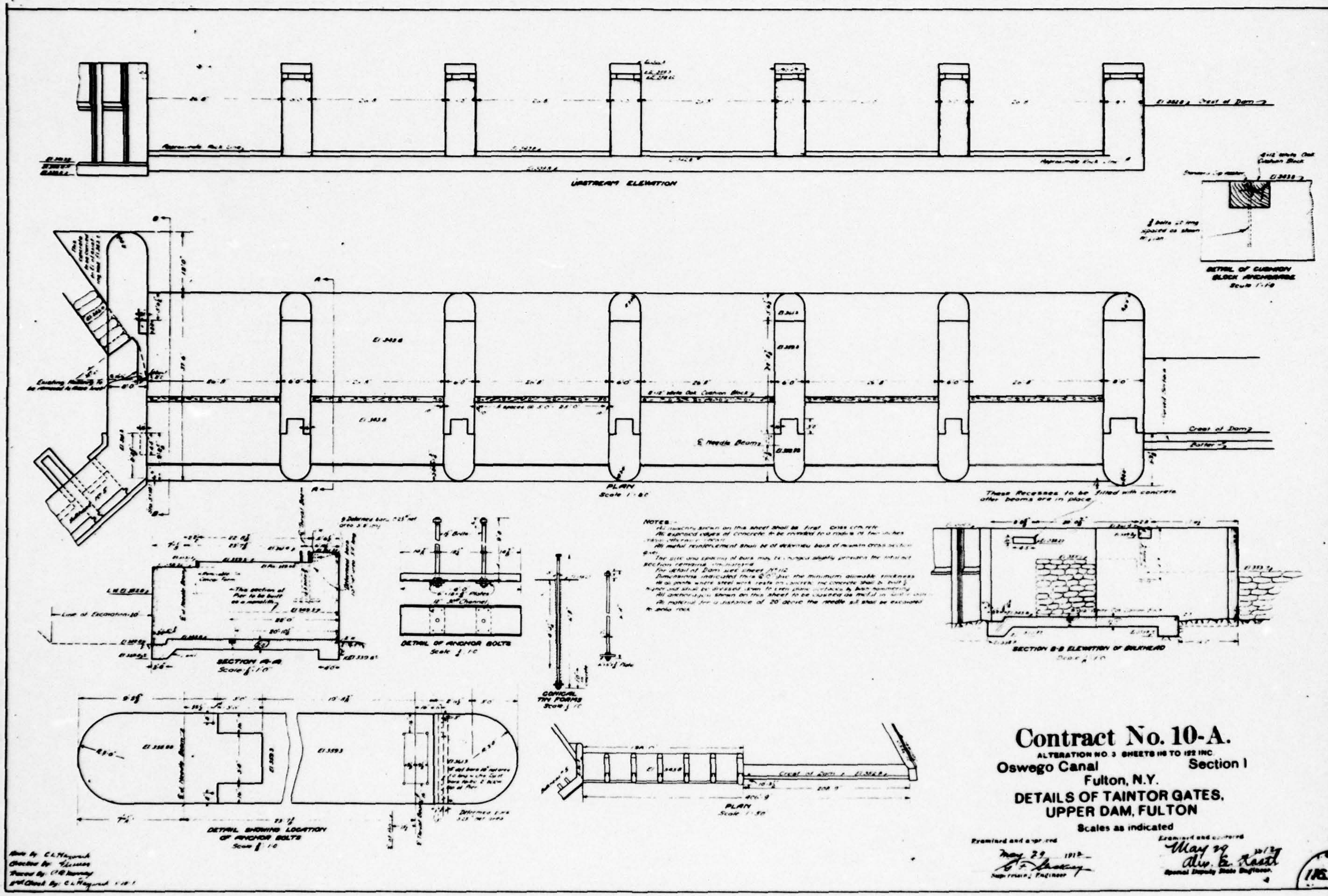

SECTION I-I
SECTION J-J
SECTION H-H
PLAN - BULKHEAD NO. 5
For details of pier heads, gate guides, sill angles, etc., see Sheet No. 312
All exposed edges of concrete to be rounded to a radius of one inch unless otherwise shown.
17 Openings 6'6" clear
SECTION K-K
SECTION N-N
SECTION L-L
SECTION M-M
PROFILE ALONG FRONT FACE - BULKHEAD NO. 5
Hor. Scale 1:20
Ver. 1:10
FRONT ELEVATION - BULKHEAD NO. 5
Contract No. 10
ALTERATION NO. II
SHEETS 80 TO 100 INC.
Oswego Canal
Section I
Fulton, N.Y.
DETAIL MASONRY PLAN FOR
BULKHEAD NO. 5
Scale: 4 feet to the inch
Examined and approved
Supervising Engineer
Examined and approved
Special Deputy State Engineer
Made by
Traced by
1st Check by
2nd Check by

FIGURE 9

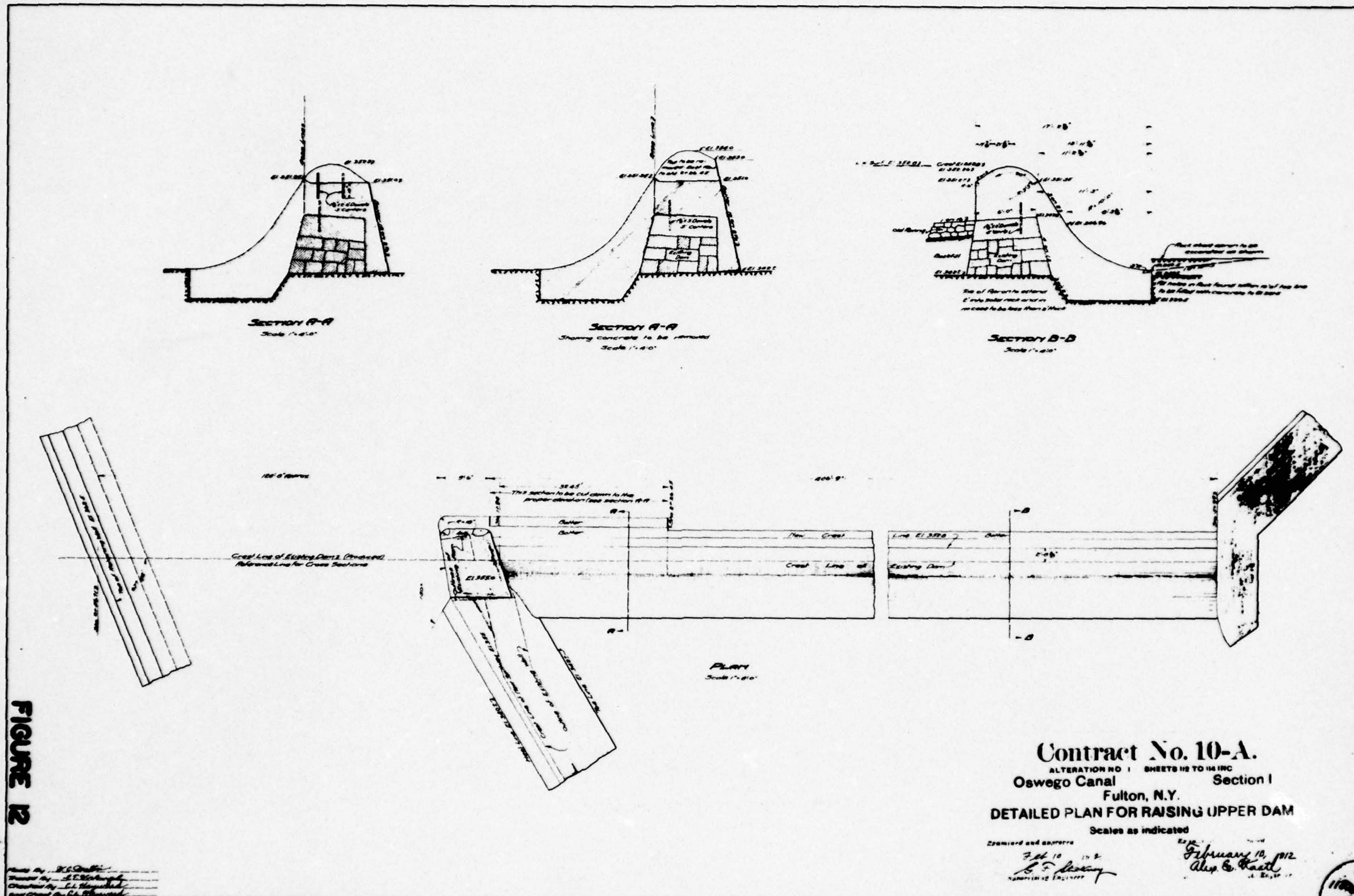


Contract No. 10-4.
Oswego Canal
Fulton, N.Y.
LOCATION PLAN AT LOCK
OSWEGO
RIVER.
AMERICAN WOOLEN Co.
FOREBAY
BULKHEAD No. 5
This work completed
For detail of Dam See Sheet No. 100
FOREBAY
BULKHEAD No. 6
MILL BUILDING
LOCK No 2
COMPLETED
OSWEGO FALLS PULP and PAPER Co.
Grade El. 340.8
Grade El. 340.8
El. 364.0
30" Concrete Drain Completed
RIGHT OF WAY
Work done
Work partly done
Work to be done



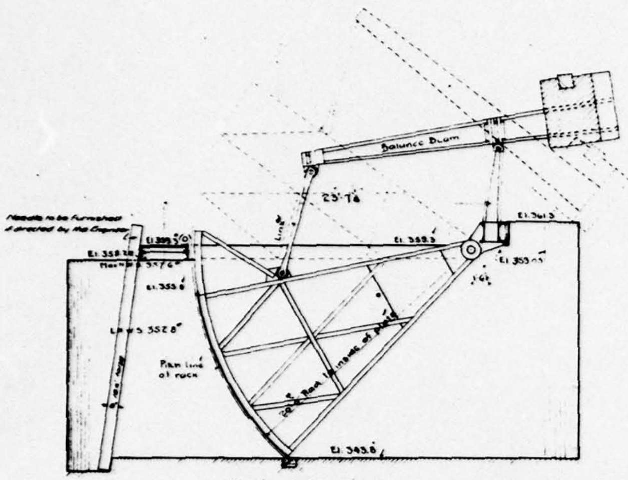
UPSTREAM ELEVATION
PLAN
Scale 1:80
DETAIL OF CUSHION BLOCK ANCHORAGE
These Recesses to be filled with concrete after beams are in place.
NOTES
SECTION A-A
DETAIL OF ANCHOR BOLTS
CONICAL TIN FORMS
SECTION B-B ELEVATION OF BULKHEAD
DETAIL SHOWING LOCATION OF ANCHOR BOLTS
PLAN
Scale 1:50
Contract No. 10-A.
ALTERATION NO. 3 SHEETS 116 TO 122 INC.
Oswego Canal
Section I
Fulton, N.Y.
DETAILS OF TAINTOR GATES,
UPPER DAM, FULTON
Scales as indicated
Examined and approved
Examined and approved

FIGURE 11

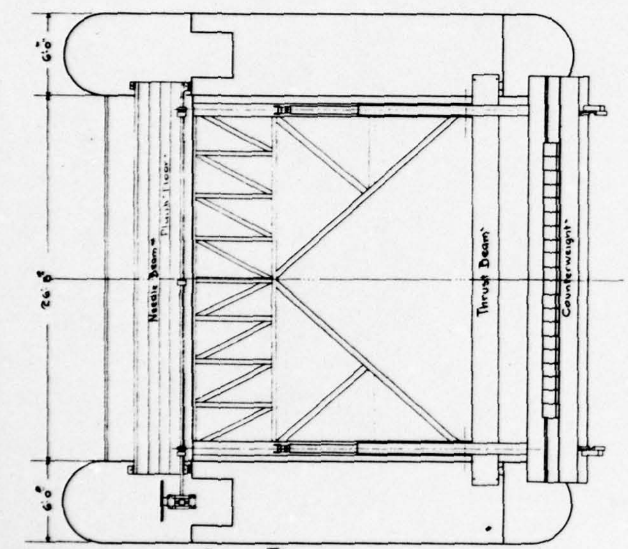


Section A-A
Scale 1"=8'0"
Section A-A
Showing Concrete to be removed
Scale 1"=8'0"
Section B-B
Scale 1"=8'0"
Crest Line of Existing Dam (Produced)
Reference Line for Cross Sections
This section to be cut down to the proper elevation (see section A-A)
New Crest
Crest Line of Existing Dam
Plan
Scale 1"=8'0"
Contract No. 10-A.
ALTERATION NO. 1 SHEETS 112 TO 114 INC
Oswego Canal Section I
Fulton, N.Y.
DETAILED PLAN FOR RAISING UPPER DAM
Scales as indicated
Examined and approved
Feb 10 1912
February 10, 1912

FIGURE 12

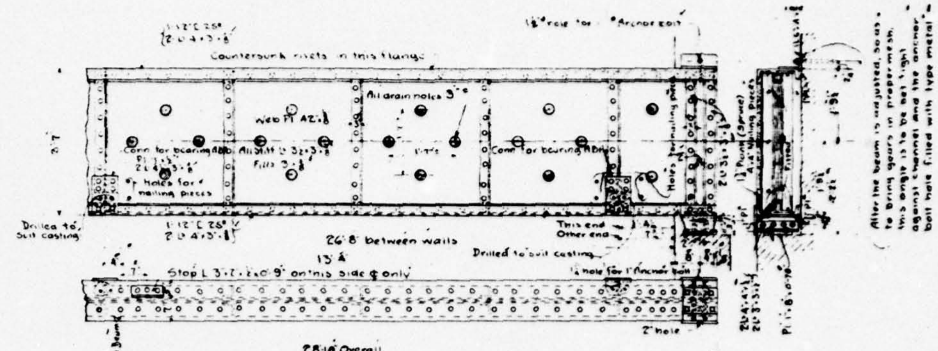


Sectional Elevation



Plan
General Drawing of Taintor Gate
Scale ⅛" = 1'-0"

MADE BY Traced from Cont. 10 with alt.
TRACED BY G. G. Oakes
1st. CHECK BY A. A. Wood
2nd. CHECK BY



28'-10" Overall

Detail of Needle Beam
Symmetrical about ℄ except as shown and noted
Scale ⅜" = 1'-0"

After the beam is adjusted, so as to bring gears in proper mesh, this angle is to be set tight against channel and the anchor bolt hole filled with type metal.

Notes on Counterweight.

Weight of 20 Adjustment Blocks with mortar, at 140 lbs. per cu. ft. - - - - - - - - - - - - - - - 3000

Weight of Counterweight, without blocks, at 140 lbs. per cu. ft. - - - - - - - - - - - - - - 72400

Total weight of Counterweight 75400

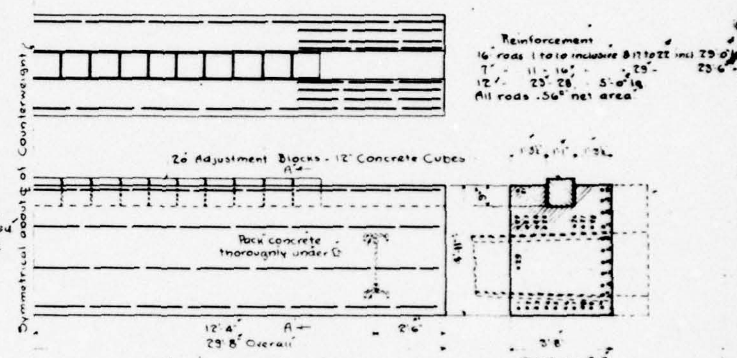
Refer to Sheet 120

If concrete actually weighs 140 lbs. per cu. ft., all Adjustment Blocks will be used. If concrete weighs more than 140 lbs. per cu. ft., only a part will be used.

After main Counterweight is in place, test gate with operating machinery and add Adjustment Blocks so as to obtain approximately equal ease of operation in either direction.

Then add six or seven Adjustment Blocks for excess counterweight.

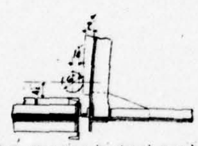
Adjustment Blocks must be finally grouted in place and must be placed symmetrically from center toward ends, leaving ends of recess open for drainage.



Reinforcement
16 rods 1 to 10 inclusive & 17 to 22 incl. 29'-0"
7 " 11 " 16 " 29'
12 " 23 " 28 " 5'-0"
All rods .56" net area

Detail of Counterweight
Scale ⅜" = 1'-0"
1st Class Concrete

Section A-A



Sketch showing highest position of Gate
Scale ⅛" = 1'-0"

Contract No. 10-A.

ALTERATION NO. 3 SHEETS 116 TO 122 INC.

Oswego Canal Section I

Fulton, N.Y.

GENERAL DRAWING & DETAILS OF COUNTERWEIGHT & NEEDLE BEAM FOR TAINTOR GATES, UPPER DAM, FULTON

Scales as indicated

Examined and approved
Feb 14 1912
W. Yates
Division Engineer

Examined and approved
May 24
Alex. E. Hunt
Special Deputy State Engineer

FIGURE 13

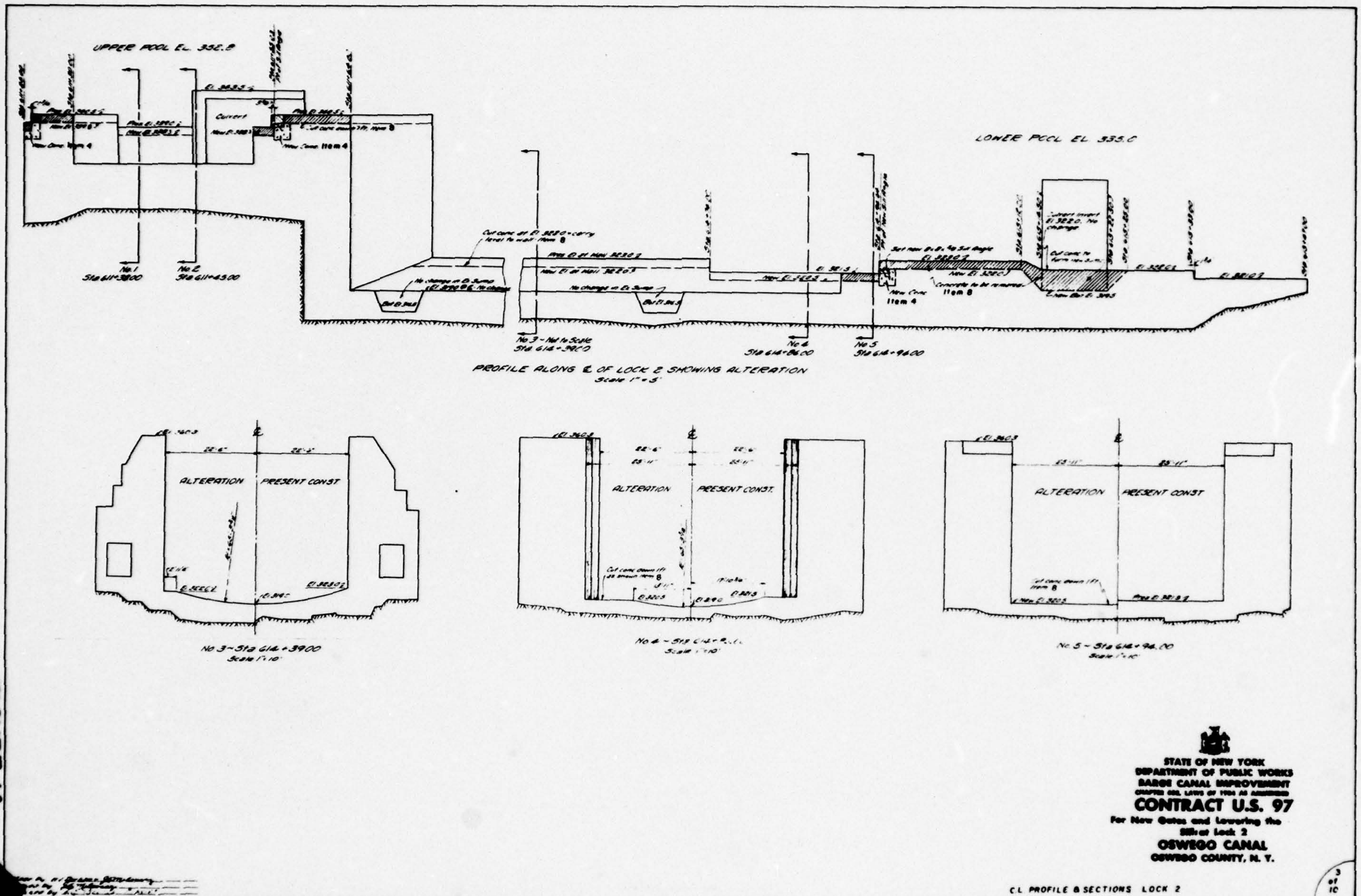

UPPER POOL EL. 332.8
LOWER POOL EL. 335.0
PROFILE ALONG ℄ OF LOCK 2 SHOWING ALTERATION
Scale 1" = 5'
ALTERATION
PRESENT CONST
No 3 ~ Sta 614+39.00
Scale 1"=10'
No 4 ~ Sta 614+
Scale 1"=10'
No 5 ~ Sta 614+96.00
Scale 1"=10'
STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BARGE CANAL IMPROVEMENT
CONTRACT U.S. 97
For New Gates and Lowering the Sill at Lock 2
OSWEGO CANAL
OSWEGO COUNTY, N. Y.
CL PROFILE & SECTIONS LOCK 2
3 of 10

FIGURE 14

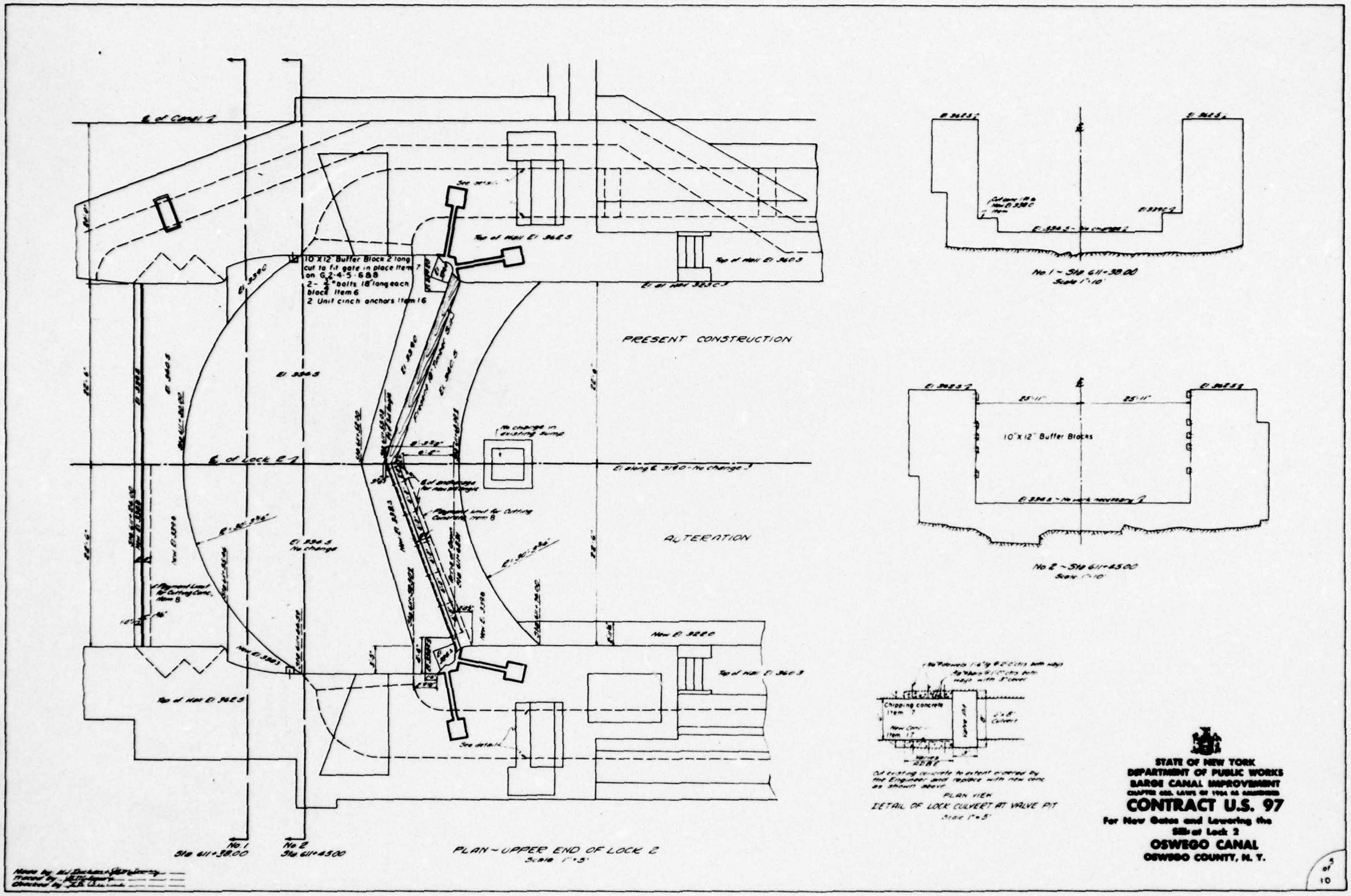
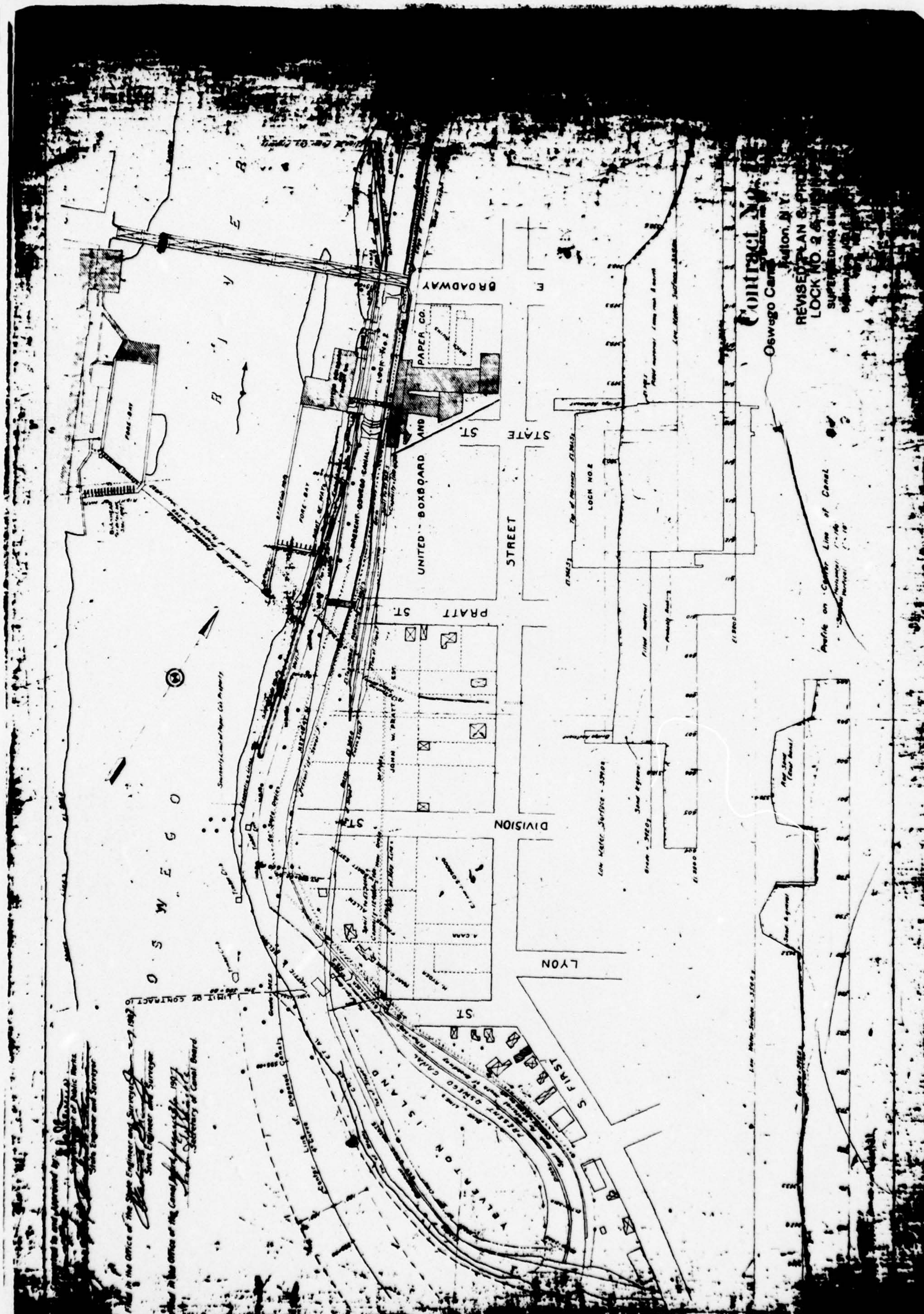

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
BARGE CANAL IMPROVEMENT
CONTRACT U.S. 97
For New Gates and Lowering the Sill at Lock 2
OSWEGO CANAL
OSWEGO COUNTY, N. Y.
PRESENT CONSTRUCTION
ALTERATION
10"X12" Buffer Block 2' long cut to fit gate in place Item 7 on G.2-4-5-6 & 8
2 - ¾" bolts 18" long each block Item 6
2 Unit cinch anchors Item 16
No 1 ~ Sta 611+38.00
Scale 1"=10'
No 2 ~ Sta 611+45.00
Scale 1"=10'
10"X12" Buffer Blocks
PLAN ~ UPPER END OF LOCK 2
Scale 1"=5'
PLAN VIEW
DETAIL OF LOCK CULVERT AT VALVE PIT
Scale 1"=5'
Chipping concrete Item 7
Top of Wall El. 362.5
Top of Wall El. 360.3
New El. 322.0
No change in existing sump
See detail
No 1 Sta 611+38.00
No 2 Sta 611+45.00

FIGURE 15

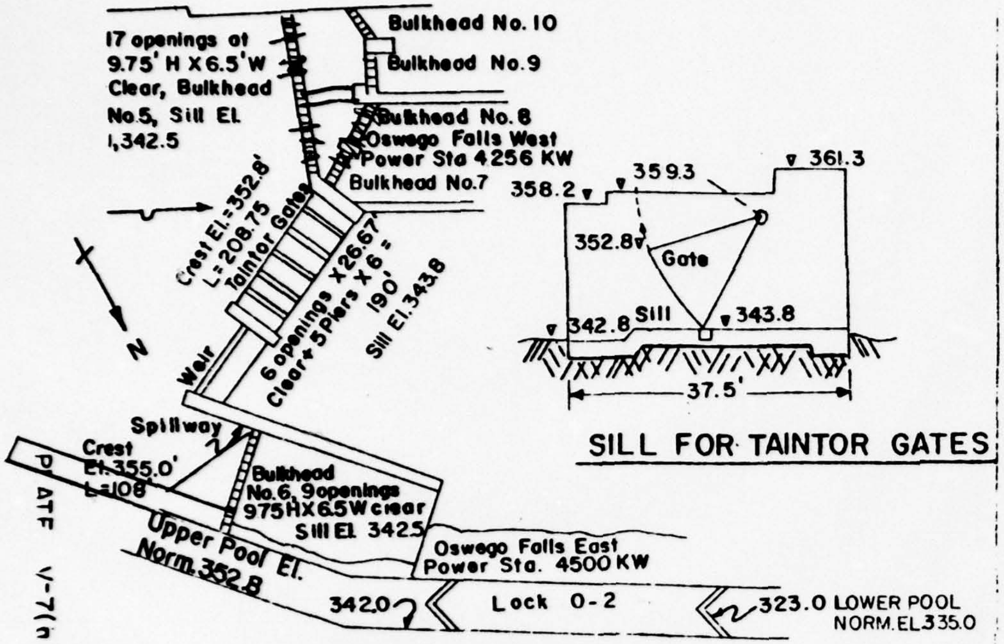


Contract No.
Oswego Canal
Fulton, N.Y.
REVISED PLAN & PROFILE
LOCK NO. 2
E BROADWAY
STATE ST.
STREET
PRATT ST.
DIVISION ST.
LYON
S FIRST ST
UNITED BOXBOARD AND PAPER CO.
LOCK NO. 2
FORE-BAY
JOHN W. PRATT
OSWEGO
RIVER
YELVERTON ISLAND
PRESENT OSWEGO CANAL
LIMIT OF CONTRACT 10
Profile on Center Line of Canal

FIGURE 16

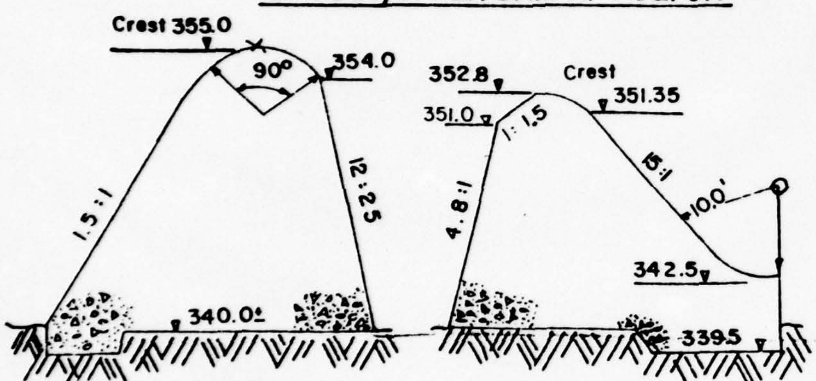
CONTROL STRUCTURE AT LOCK O-2, FULTON

(FROM N.Y.S.D.E.C.)



SILL FOR TAINTOR GATES

LAYOUT, UPPER DAM AT FULTON



SECTION OF SPILLWAY

SECTION OF WEIR

NO SCALE

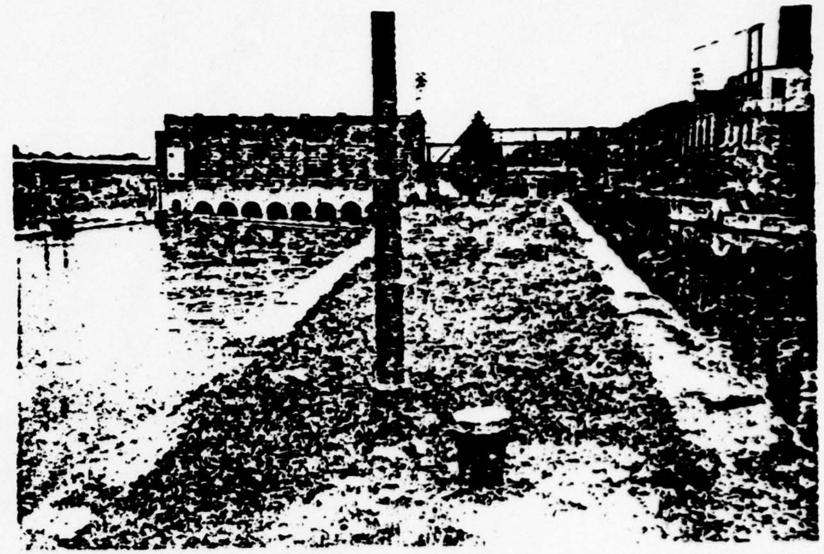
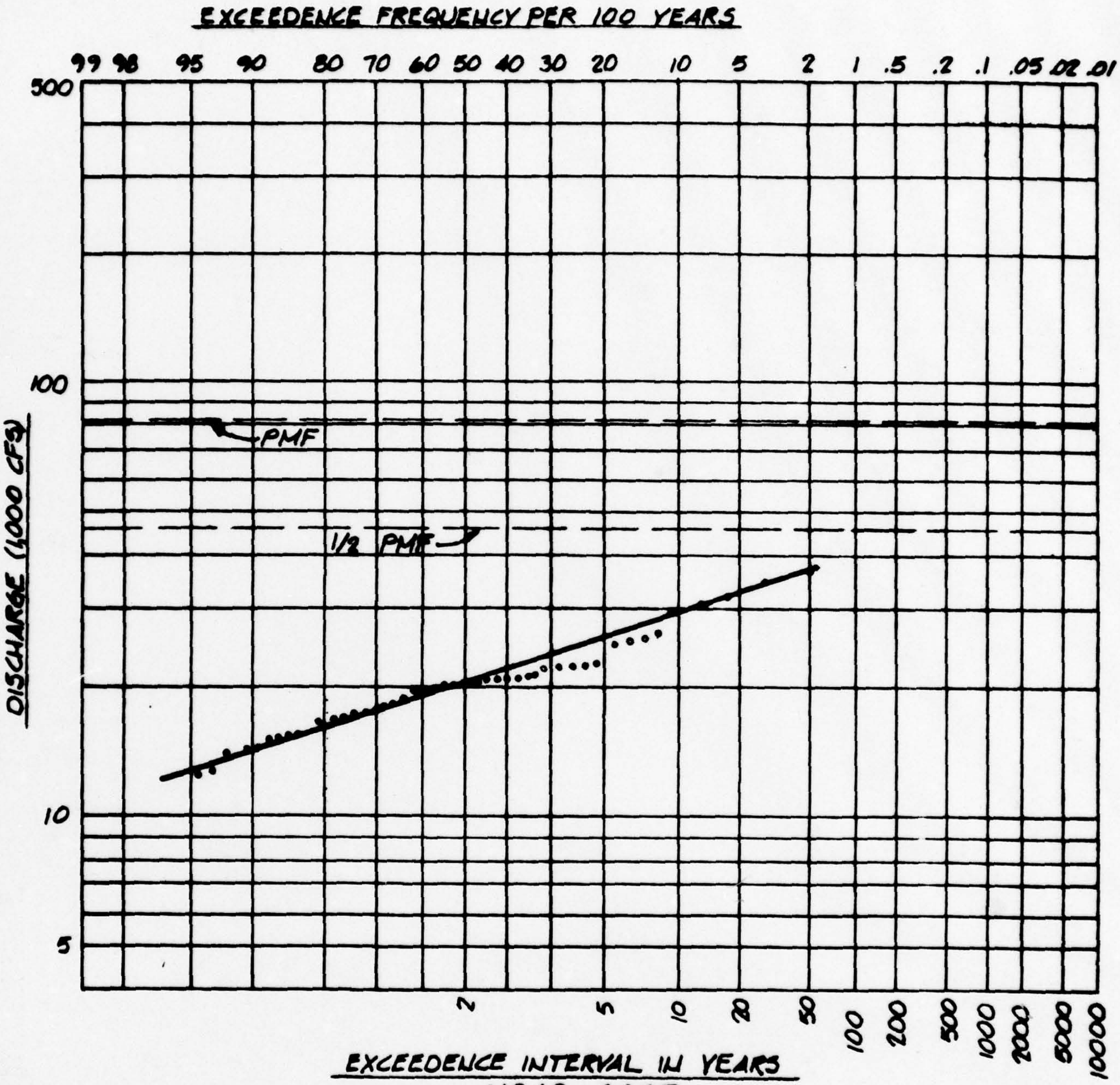


PLATE V-7(n)

FIGURE 17



USGS GAGE
STATION 04249000
TOTAL DRAINAGE AREA = 5121 SQ MI
GAGE DATUM = 246.0 FT
PERIOD OF RECORD = 1934 - 1974

DISCHARGE - FREQUENCY CURVE

STETSON • DALE	DATE 6·28·79	DRAWN JPG	OSWEGO RIVER LOCK #7
	JOB 2305	FIGURE 18	

APPENDIX A

FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Upper Fulton Dam at Lock 2 County Oswego State New York ID # 408

Type of Dam Concrete Gravity Hazard Category High

Date(s) Inspection June 7, 1979 / June 13, 1979 Weather Sunny Temperature 70's

Pool Elevation at Time of Inspection (1) 354.5* (2) 354.05 M.S.L. Tailwater at Time of Inspection (1) 236.5 (2) --

Use of Dam: Hydro Power Navigation Lift: Lock 3 to 2: 27 feet

This inspection does not pertain to an independent evaluation of the condition of the lock or hydropower facility.

Inspection Personnel:

(1),(2) F.W. Byszewski-Stetson-Dale	(1),(2) Richard Aldrich	N.Y.S.D.O.T., Region 3 Office
(1),(2) N.F. Dunlevy-Stetson-Dale	(1),(2) Robert McCarthy	N.Y.S.D.E.C., Dam Safety Section
(1),(2) D.F. McCarthy-Stetson-Dale	(2) Robert Levett	Niagara Mohawk Power Corporation
(1),(2) H. Muskatt-Stetson-Dale	(2) John Brennan	Niagara Mohawk Power Corporation
(2) B. Colwell - Stetson-Dale		

N. F. Dunlevy Recorder

*Barge Canal Datum (USGS to 99 feet)

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	Limited seepage through main dam crest along construction joint. Seepage at junctions of main spillway and side spillway on east side of dam. Seepage along hydropower intake river side wall. Extensive seepage midway along wall.	In general seepage is along construction joints of eroded concrete. This deteriorated concrete should be repaired. Condition could eventually lead to partial failure of spillway along one or more monoliths.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Deteriorated corner of spillway sections is severely deteriorated and eroded exposing both original masonry dam stonework and reinforcement bars. Some seepage is present.	This area should be repaired. The structural integrity of this section of the dam is questionable. Condition could lead to partial failure of spillway system along adjoining monoliths.
DRAINS	None observed.	
WATER PASSAGES	Only water passage noted is in front of east side power house through masonry forebay wall.	No recommendations.
FOUNDATION	Weather sandstone bedrock has extensive fractures and vertical joints. The rock is seamed with porous deteriorating layers causing erosion and dropping of foundation 2-3 feet encroaching apron of spillway and pier of tainter gate system.	Alternatives should be investigated to strengthen foundation of dam. More in depth field investigation should be performed to locate extent of cracks. The upstream face of the dam foundation should be evaluated.

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Surface erosion has cut deeply into the spillway surface. Although large openings in concrete are not evident, substantial portions of the dam's concrete or suspected to be structurally weakened.	Concrete cores should probably be taken and tested throughout the dam prior to any surface repairs. The condition of the concrete is such that partial failure of the dam at certain monoliths could occur.
STRUCTURAL CRACKING	No large open cracks observed. Erosion and deterioration of concrete prevails.	No remarks.
VERTICAL & HORIZONTAL ALIGNMENT	No movement observed in dam.	No remarks.
MONOLITH JOINTS	Monolith joints are eroding. Some seepage along joints.	See comments above.
CONSTRUCTION JOINTS	Construction joints are eroding. Some seepage along joints.	See comments above.
STAFF GAGE OF RECORDER	Operating at Lock	No remarks.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	N/A	
RIPRAP FAILURES	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A	
ANY NOTICEABLE SEEPAGE	N/A	
STAFF GAGE AND RECORDER	N/A	
DRAINS	N/A	

UNGATED SPILLWAY

Crested Spillway extends across the eastern half of the river and turns up hydropower in the channel.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	See comments Sheets 2 and 3	
APPROACH CHANNEL	Upstream face of dam approach channel is effective width of river (less tainter gates).	No remarks
DISCHARGE CHANNEL	Effective width of river (less tainter gates). Movement of bedrock foundation of ungated spillway could be undermined and is being encroached upon.	See Sheet 2 "Foundation".
BRIDGE AND PIERS	None	No remarks.

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Observation conditons poor. Tainter gates leak significantly, mostly along side panels.	No recommendations.
APPROACH CHANNEL	Upstream face of dam, west side of river.	
DISCHARGE CHANNEL	Downstream face of dam, west side of river. Discharges onto bedrock. Deteriorated falling bedrock is encroaching pier of several tainter gates.	Further investigation of bedrock condition is warranted.
BRIDGE AND PIERS	Tainter gate pier has surface spalling including at location of trunion supports. Counterbalances made of concrete are starting to deteriorate significantly.	Surface concrete should be repaired on the tainter gate system.
GATES AND OPERATION EQUIPMENT	Manually operated rack and pinion devices are in working condition.	No recommendations made.

OUTLET WORKS

Only Outlets are through tainter gates, power house and Lock. Neither of these can completely drawdown reservoir pool, however capacity exists to drawdown below crest.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None.	
INTAKE STRUCTURE	None.	
OUTLET STRUCTURE	None.	
OUTLET CHANNEL	None.	
EMERGENCY GATE	None.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Channel clear and unobstructed. Bed of channel is rock.	No remarks.
SLOPES	Channel slopes towards Lower Fulton Dam pool at Lock 3 less than a mile downstream.	No remarks.
APPROXIMATE NO. OF HOMES AND POPULATION	The dam is 1/2 mile upstream of Lock 2. The east bank of the river is the location of the central business district and park area. Generally, most property is 10-15 feet above the reservoir and/or downstream low flow river elevation. A cursory examination of the reach lists the following: residential and commerical. The hydro generation station and lock could incur damages. Loss of life potential could be more than 4 people from either a flood flow or normal operating situation dam breach. A substantially higher loss of life potential is not foreseeable.	Since the dam is located across a navigable waterway heavily used for recreational travel, a high hazard rating is appropriate.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
OBSERVATION WELLS	None observed.	
WEIRS	None observed.	
PIEZOMETERS	None observed.	
OTHER	None observed.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Some sloped terrain into river and dam pool.	Not foreseen as a source of sediment deposition or landslides.
SEDIMENTATION	No sedimentation build up observed.	No remarks.

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM Upper Fulton at Lock 2

ID # 408

ITEM	REMARKS
AS-BUILT DRAWINGS	See this report.
REGIONAL VICINITY MAP	See this report.
CONSTRUCTION HISTORY	No data.
TYPICAL SECTIONS OF DAM	See this report.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report.
RAINFALL/RESERVOIR RECORDS	Not obtained for this inspection.

ITEM	REMARKS
DESIGN REPORTS	No data.
GEOLOGY REPORTS	No data.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	No data.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	No data.
POST-CONSTRUCTION SURVEYS OF DAM	No data.
BORROW SOURCES	N/A.

ITEM	REMARKS
MONITORING SYSTEMS	Information available at locks and hydropower generation facility.
MODIFICATIONS	None.
HIGH POOL RECORDS	No data.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	No data. Limited to information on previous inspection reports, see this report.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	No data.
MAINTENANCE OPERATION: RECORDS	Same comment as above for monitoring system.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See this report.
OPERATING EQUIPMENT PLANS & DETAILS	See this report. More information available from N.Y.S.D.O.T. See card file on maintenance and improvements in this report.

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

Elevations: Barge Canal Datum (USGS + 0.99 feet)

DRAINAGE AREA CHARACTERISTICS: 5100 (±) square miles.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): Nav. season w/flashboards
Winter season w/o flashboards

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ---

ELEVATION MAXIMUM DESIGN POOL: ---

ELEVATION TOP DAM: 362.50

CREST:

Side Channel Crest		355.00
Main Weir	Navigation Season w/flashboards	354.05
	Winter Season w/o flashboards	352.80

a. Elevation
b. Type Crest shaped - see report.
c. Width Crest shaped - see report.
d. Length Side channel crest 108 feet; weir 208.75 feet.
e. Location Spillover East side of river
f. Number and Type of Gates Tainter, 6 openings at 26.67 feet, crest elevation 252.8 feet.

OUTLET WORKS:

a. Type 7200 cfs conbines through power houses.
b. Location 3600 cfs on east side plant; 3600 cfs on west side plant (not in operation)
c. Entrance Inverts ----
d. Exit Inverts Tainter gates also. ----
e. Emergency Draindown Facilities Limited use through power house. Reservoir cannot be completely drawn down. Cannot drawdown through lock without damage to gates.

HYDROMETEOROLOGICAL GATES:

a. Type ---
b. Location ---
c. Records ---

MAXIMUM NON-DAMAGING DISCHARGE: Significant 70,000 cfs
Recreational Hazard at 0 cfs.

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

OSWEGO
LOCK NO. 2 FULTON STA. 613+00 Con. ~~U.S.~~ 10
Equip. " ~~U.S.~~ 90A
" U.S. 97

Lower Pool 335.00 Upper Mitre Sill 339.8
Upper Pool 352.80 Lower Mitre Sill 322.0
6 x 8 Valves

1927 - New work shop constructed.
1929 - Anchors for gate "A" frames installed. Gates painted.
1930 - Iron stairs installed at no. end of lock. New water guage installed at no. end of lock.
1931 - New timber rub strips placed on S.E. gate. Storm sewer built on so. side to stop WASHOUT OF LAWN. New armature in N.E. gate motor.
New rods on chains of S.W. Valve. LOCK SIGNAL LIGHT SYSTEM INSTALLED
1932 - removed capstans & replaced with another type capstans.
32-3 - Unwatered lock, new rails & wheels on all valves, new cup & saucer castings on both lower gates, new top section on quoin posts in both up & low Rt. gates, removed power cables to Lk. 3 from lock chamber and placed on cable bridge. Equalizers placed on both upper valves.
1933 - Checker plates on anchor rod recesses-lower end. New type light covers placed on motor boxes. Painted all structures. Powerhouse & shop two coats of concrete paint.
1939 - Gate spars replaced with heavier type.
1943 - Upper end of lock overhauled.

43-4 - Unwatered, new timbers lower gate, valves replaced, culvert gratings repaired, new pivots & saucers, light poles shortened.
1945 - Powerhouse painted, new thrust bearing on 1 generator.
1946 - New trash rack - power culvert. Underpinned wall at E. end dam, cleaned culvert under upper end lock. Generators & turbines overhauled, Wicket machinery removed & rebuilt. Water supply system & toilet installed.
1947 - Valve motors reinstalled above wall level, one turbine & generator overhauled.
1948 - Valve mach. at lower end raised to bring gearing above high W.S.
1949 - Lock light poles cut down to approved height. New oper. stand shelter.
1952 - Lower left valve replaced.
1953 - Unwatered, lower sills replaced with angle iron up. sills repaired, 8" oak seal on lower gates, all gates painted, all valves reconditioned, new seating rails, new chains, new Z bars. New walk on cable bridge, new walk on Rt. gate, replaced 100' walk, overhead gates, new steel ladder.
1954 - Replaced worn rub sticks on gates.
1955 - Motors overhauled, oil heat plant installed in shop & powerhouse. Relocated limit switches for valve & gate motors. Lockhouse remodeled.
1956 - New roof for powerhouse, installed timbers on approach wall.
1957 - Oil furnaces installed in lockhouse & powerhouse. Lock ladders rebuilt, rub sticks replaced. New walk for cable bridge. Limit switch panels replaced.
1958 - Poured 80' of E. wall above Lk. & 160' on E. wall between Lk. #2 & #3.
1959 - Contract U.S. 97, sills lowered, New gates. Poured top of E. wall above lock. Head gates rebuilt, waterwheel overhauled.
1960 - Replaced stop log, rebushed anchor arms, Up Rt. lock gate. New buffer beam recess New steel stairs on Up & Low end. Refaced 700' approach wall. Dismantled & overhauled Gen. & waterwheel. Replaced oak stop logs.

1961 - New water line, New septic tank, New fuel tank, Installed guard posts.
1962-3 - Lower gate motors repaired, waterwheels inspected & repaired. Powerhouse switchboard rewired. Gate machinery rebuilt. New valves, new cup wheels & chain. Quoin & miter timbers adjusted and new seal strips for upper gates.
1964 - New commercial power service, new generator room.
1965 - Powerhouse machinery dismantled & removed - building razed. New parking lot for three cars constructed on W. side.
1965 - Dewatered for winter repairs - valves, rails & zees, gates, timber seals. Extended gate anchor arms & repaired conc. Refaced top of lock wall. Old powerhouse razed, roof placed over old lockhouse basement. Rub sticks replaced on lower approach wall.

①

STRUCTURE INVENTORY - GENERAL LISTING

STRUCTURE ID NO SEC/HIST	TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
WS F0F1 701	2A	F						BRIDGE ACROSS LIMESTONE FEEDER
WS F0R5 701	2A	F						FARM BRIDGF OVER LIMESTONE CREEK
WS 0002 701	2B	O	116+50				103	LOCK ST BR PHOENIX
WS 0003 701	2B	C	122+65				85	BRIDGE ST BR PHOENIX
WS 0004 701	2B	O	126+30	352.8			167	CULVERT ST BR PHOENIX
WS 0007 701	2B	O	613+65				117	SWING BR AT LOCK 02
WS 0001 701	2C	E						BRIDGE OVER OLD CAUGHDENOY LOCK
WS F0B1 701	2C	F						ANDREWS ROAD BRIDGE
WS F0B2 701	2C	F						FARM BR. S. OF ANDREWS RD., BUTTERNUT FEEDER
WS F0D1 701	2C	F						TWIN PIPE CULV S.LAKE RD - DERUYTER
WS F0D2 701	2C	F						BOX CULV. E. LAKE ROAD DERUYTER
WS F0D3 701	2C	F						FARM BRIDGE , DERUYTER INLET
WS F0D4 701	2C	F						FARM BRIDGE , DERUYTER INLET
WS F0D5 701	2C	F						BRIDGE OVER DERUYTER OVERFLOW
WS 0024 701	3A	E	3932+00	374.0	13.2		45	BALDWINSVILLE DAM
WS F0B1 701	3A	F			5.0			BUTTERNUT CREEK DIVERSION DAM
WS F0D1 701	3A	F		1288.0	70.0			DERUYTER DAM
WS F0D2 701	3A	F						DERUYTER INLET DIVERSION DAM
WS F0F1 701	3A	F		430.0	6.5			LIMESTONE CREEK DIVERSION DAM
WS F0J1 701	3A	F		645.5				JAMESVILLE DAM
WS 0001 701	3A	O	117+00	363.0	11.0	6	80	PHOENIX DAM Total Dam
WS 0002 701	3A	O	608+60				10	UPPER DAM FULTON "
WS 0003 701	3A	O	641+00	335.0	17.0		10	LOWER DAM - FULTON Key J
WS 0005 701	3A	O	971+00	308.0	19.5		37	DAM 5 AT MINETTO
WS 0006 701	3A	O	1146+25	290.0	33.0		37	DAM 6 -HIGH DAM AT LOCK 04 - OSWEGO

31 5 (1a)

	F.A.C. DAM STRUCTURE ID NO			1977 FOUND + STRUCT			SPILLWAYS					DAM-CONC					DAM EARTH			WTR CNTRL DEVICES						GATE HOUSE					
	SECTION NO	IDENT NO	TYPE	FOOTING	APRON	WNGWLLS	CREST	UPSTRM FACE	DWNSTRM FACE	JOINTS	FLSHBDS	TOP OF DAM	UPSTRM FACE	DWNSTRM FACE	JOINTS	VALVE WELLS	TOP OF DAM	UPSTRM FACE	DWNSTRM FACE	PIPES	PIPE JOINTS	STOP LOGS	TRASH RACKS	VALVES	CHAINS	ROOFS	WLLS WNDWS	FOUNDATION	RLNG FNCNG	STRWYS	GENERAL RECOMMEND	
	5	0024	3A	X	X	5	5	X	7	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	~~Joint~~ Joints need grouting
	5	FOB1	3A	N	X	0	7	X	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	Washout under W. Wingwall resulting in collapse
#33	5	FOD1	3A	N	N	N	N	N	N	N	N	N	N	N	N	N	7	7	7	N	N	N	N	N	N	7	7	N	7	5	7	Underdrains plugged - need repair or replacement
#34	5	FOD2	3A	N	3	7	7	7	7	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	apron planks miss. leaks thru stone in crest
	5	FOF1	3A	N	3	4	7	X	7	X	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	East W. wall settling
				X	N	N	7	X	3	0	N	7	5	1	0	N	N	N	N	N	N	N	N	N	N	5	7	X	N	7	1	bulge in downstream face, increased leak. west side, pt. jts., remove br-
#1	5	[illegible]001	3A	X	X	5	7	X	7	X	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#14	5	[illegible]002	3A	X	7	7	5	X	3	X	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	
#18	5	[illegible]003	3A	X	N	3	3	X	3	3	N	3	X	3	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
#24	5	[illegible]005	3A	X	X	3	3	X	3	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
#26	5	[illegible]006	3A	X	X	3	5	X	5	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	
#28	5	[illegible]007	3A	X	7	7	7	X	7	5	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
	5	X001	3A	3	N	3	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
	5	Y001	3A	X	5	5	3	3	3	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	

(2)

STRUCTURE INVENTORY - GENERAL LISTING

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
WS 0037 701 3A	O	1166+00	270.0	12.0		35	CURVED DAM AT LOCK 07 - OSWEGO
WS X001 701 3A	X						CARPENTER BROOK DIVERSION DAM (NOT NEEDED)
WS Y002 701 3A	Y	5090+00	375.4			5	OWASCO CREEK ENTRANCE 550FT LEFT
WS 0023 701 3C	E		369.9	8.0		M93	CAUGHDENOY DAM
WS 0124 701 3D	E	3931+50			1	635	TAINTOR GATE CONT M63-5
WS F002 701 3D	F				1		WASTE GATE - BUTTERNUT AQUEDUCT
WS F081 701 3D	F				2		BUTTERNUT FEEDER BULKHEAD
WS F004 701 3D	F				4		DERUYTER INLET HEADGATES
WS F003 701 3D	F			5.0			STREAM ENT. - DERUYTER INLET
WS F001 701 3D	F		1280.0	3.0			DERUYTER DAM SPILLWAY
WS F002 701 3D	F				3		DERUYTER DAM OUTLET GATES
WS F0F1 701 3D	F				4		LIMESTONE FEEDER BULKHEAD
WS F001 701 3D	F				1		WASTE GATE - LIMESTONE AQUEDUCT
WS F0J1 701 3D	F						JAMESVILLE DAM SPILLWAY
WS F0J2 701 3D	F				3		JAMESVILLE DAM OUTLET GATES
WS 0031 701 3D	O		363.0	12.0	6	80	TAINTOR GATES Key E, Movable Crest
WS 0021 701 3D	O		363.0			80	NORTH AUTO FLASHBOARD BLOCKED TOP Key D
4 WS 0051 701 3D	O		363.0			80	SOUTH AUTO FLASHBOARD BLOCKED TOP Key F
WS 0011 701 3D	O		363.0	11.0		80	NORTH SPILLWAY Key D
WS 0041 701 3D	O		363.0	11.0		80	SOUTH SPILLWAY Key F
WS 0012 701 3D	O		352.8	10.3		10A	SPILLWAYS Key H
6 WS 0022 701 3D	O				6	10A	TAINTOR GATES Key I
WS 0001 701 3D	O	661+00	311.0			205	SPILLWAY IN DIKE BELOW LOCK 03
WS 0005 701 3D	O	1180+75				35	BY-PASS CULVERT ABOVE LK 07 2 GATES
WS 0007 701 3D	O	1184+80			1	709	FEED GATE - LOCK 07

SLUICE GATES, SPILLWAYS, WASTE WEIRS - 1977

3D-5 2a

	STRUCTURE ID NO: SCTN	STRUCTURE ID NO: STRC NO	STRUCTURE ID NO: TYPE	CONCRETE: ABTMNTS	CONCRETE: PIERS BLKHDS	CONCRETE: UPSTRM APRON	CONCRETE: DWNSTRM APRON	CONCRETE: SPLLWY SRFCE	CONCRETE: SPHN INTRIOR	SUPER STRUCTURE: OPRTNG TRESTLE	SUPER STRUCTURE: CATWALKS	SUPER STRUCTURE: RAILINGS	MACHINERY: STEM, GEARING	MACHINERY: FLR STD ETC	SL GATES: SPHN VLVL LNR	SL GATES: GATE FRAME	SL GATES: GATES SKN PLATE	SL GATES: GATE SEALS	SL GATES: SEATS	SL GATES: GUIDES	GATES FLSHBRDS: BOARDS	GATES FLSHBRDS: ANCHORS	STPLGS: STOPLOGS	STPLGS: GUIDES	ELECT: MOTORS	ELECT: WIRING	TRASH RACKS	GEN RECOMMEND	
	5	0124	3D	7	7	X	X	7	N	7	7	7	7	N	N	7	7	7	7	7	N	N	N	N	7	7	N	7	N. cable frayed
	5	F002	3D	7	N	N	N	N	N	N	N	N	N	N	N	7	7	7	5	7	N	N	N	7	N	N	N	7	
	5	F0M1	3D	7	7	X	X	X	N	N	N	N	N	N	N	X	X	X	X	7	N	N	N	7	N	N	N	7	
#35	5	F0D4	3D	7	7	X	7	N	N	7	7	7	7	7	N	7	7	7	7	7	7	7	N	N	N	N	7	7	clear brush out of walls, clean silt + debris above
#36	5	F0D3	3D	7	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	some stones moved
#37	5	F0D1	3D	7	N	7	7	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	broken floor stand
#38	5	F0D2	3D	N	N	N	N	N	N	7	N	N	5	1	N	X	X	7	7	X	N	N	N	N	N	N	N	3	
	5	F0F1	3D	7	5	X	7	N	N	N	7	7	N	N	N	N	N	N	N	N	N	N	7	7	N	N	N	7	
	5	F001	3D	7	N	N	N	N	N	N	N	N	N	N	N	N	5	5	5	5	N	N	N	N	N	N	N	5	
	5	F0J1	3D	7	N	X	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	Abutment needs pointing
	5	F0J2	3D	N	N	N	N	N	N	3	N	N	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	3	
#2	5	0031	3D	1	1	N	X	N	N	N	3	3	5	5	N	1	1	1	X	N	N	N	N	N	N	N	N	1	main anch. poor, elect. poor, finish paint., all conc. poor
#3	5	0021	3D	5	N	N	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#4	5	0051	3D	5	N	N	X	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#5	5	0011	3D	5	N	N	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#6	5	0041	3D	5	N	N	X	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#15	5	0012	3D	3	1	N	5	1	N	N	N	N	N	N	N	N	N	N	N	N	7	5	N	N	N	N	N	3	6"+/- of surface worn away, corner pier - v. poor, hole in spill crest
#16	5	0022	3D	7	7	X	7	N	N	N	7	7	7	7	N	5	5	3	7	N	N	N	N	N	N	N	N	3	align. racks + pinion, paint, leakage thru abut wall
	5	0001	3D	3	N	N	X	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	
#29	5	0005	3D	7	7	N	X	X	N	6	N	N	7	7	N	7	7	7	7	7	N	N	N	N	N	N	N	5	
#30	5	0007	3D	7	N	X	N	N	N	7	N	N	7	7	N	7	7	7	7	7	N	N	N	N	7	7	X	7	
	5	0002	3D	5	N	N	N	7	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	Paint frame holding grating
	5	0003	3D	7	N	N	N	7	N	N	7	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
	5	Y001	3D	5	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	

(3)

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
WS 0002 701 3D	O	1191+00	255.8			W64	SIDE SPILLWAY BETWEEN LOCKS 07 & 08
WS 0003 701 3D	O	1203+71	255.8			W64	SIDE SPILLWAY WEST WALL ABOVE LOCK 8
WS Y001 701 3D	Y	60+15				T20	ONONDAGA CREEK SPILLWAY
WS 0224 701 3E	E	3931+90				208	TAINTOR GATE NW POWER RACE 530 FT L
WS F001 701 3E	F						OVERFLOW FLUME -DERUYTER DAM
WS F002 701 3E	F						DERUYTER OUTLET FLUME
WS 0051 701 3E	O	118+80			3	80	SOUTH HEADGATE NO 1 PLUGGED Key G
WS 0061 701 3E	O	119+10			4	80	SOUTH HEADGATE NO 2 PLUGGED " "
WS 0071 701 3E	O	119+40			3	80	SOUTH HEADGATE NO 3 PLUGGED " "
WS 0011 701 3E	O	121+80	352.0	13.3	8	80	NORTH HEADGATE NO 1 Raceway SILL
WS 0021 701 3E	O	121+56			3	80	NORTH HEADGATE NO 2 PLUGGED Key C
WS 0031 701 3E	O	121+42			3	80	NORTH HEADGATE NO 3 PLUGGED " "
WS 0041 701 3E	O	121+28			3	80	NORTH HEADGATE NO 4 PLUGGED " "
WS 0053 701 3E	O	640+00				108	POWER FOREBAY - LOCK 03 - FULTON Key D
WS 0043 701 3E	O	640+35			2	108	BULKHEAD NO 4 W SIDE LOWER DAM Key M
WS 0033 701 3E	O	640+50			10	108	BULKHEAD NO 3 W SIDE LOWER DAM " "
WS 0023 701 3E	O	642+20			3	108	BULKHEAD NO 2 E SIDE LOWER DAM Key H
WS 0063 701 3E	O	652+00				10	POWER TAILRACE BELOW LOCK 03 Key P
WS 0005 701 3E	O	972+15				37	BULKHEAD NO 5 - MINETTO
WS 0052 701 3E	O				17	10	BULKHEAD NO 5 (UPPER DAM) Key G
WS 0006 701 3E	O	1145+90			24	37	BULKHEAD NO 6 - HIGH DAM - OSWEGO
WS 0077 701 3E	O	1169+06			24		BULKHEAD NO7 - CURVED DAM - OSWEGO
WS 0017 701 3E	O	1185+00				35	HYDRAULIC CANAL BULKHEAD (SEALED)
WS 0001 701 4A	E		369.9			T28	CLEVELAND TERMINAL
WS 0002 701 4A	E						DOCK-FRENCHMANS IS

3E-546

3a

SLUICE GATES SPILLWAYS WASTE WEIRS - 1977

	STRUCTURE ID NO			CONCRETE						SUPER STRUCTURE			MACHINERY			SL GATES					GATES FLSHBRDS		STPLGS		ELECT		TRACKS RACKS	GEN RECOMMEND
	SCTN	HSTRC	TYPE	ABTMNTS	PIERS BLKHDS	UPSTRM APRON	DWNSTRM APRN	SPLWY SRFCE	SPHN INTRIOR	OPRTNG TRSTLE	CATWALKS	RAILINGS	STEM GEARING	FLR STD ETC	SPHN VLV LNR	GATE FRAME	GTE SKN PLATE	GATE SEALS	SEATS	GUIDES	BOARDS	ANCHORAGE	STOPLOGS	GUIDES	MOTORS	WIRINGS		
•	5	0224	3E	5	N	X	X	X	N	7	7	7	7	7	N	6	6	X	X	N	3	3	N	N	N	N	N	5
[illegible]	5	F001	3E	N	N	N	N	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3
[illegible]	5	F002	3E	7	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	9
#7	5	0051	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#8	5	0061	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#9	5	0071	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#10	5	0011	3E	5	5	X	X	N	N	7	5	3	7	3	N	3	3	3	3	3	N	N	N	N	N	N	N	3
#11	5	0021	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#12	5	0031	3E	3	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#13	5	0041	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#19	5	0053	3E	6	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	9
#20	5	0043	3E	7	3	X	X	N	N	N	N	7	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	3
#21	5	0033	3E	7	3	X	X	N	N	N	N	7	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	3
#22	5	0023	3E	3	3	X	X	N	N	N	N	1	3	3	N	X	X	X	X	X	N	N	N	N	X	3	3	3
#23	5	0063	3E	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3
#25	5	0005	3E	5	3	N	N	N	N	7	3	7	3	N	N	3	1	3	N	N	N	N	N	N	N	N	N	3
#11	5	0052	3E	7	5	X	X	N	N	N	7	N	3	3	N	3	X	X	X	X	N	N	N	N	N	N	N	3
#27	5	0006	3E	3	5	N	N	N	N	7	7	N	N	3	N	5	4	X	X	5	N	N	N	N	N	N	N	5
#21	5	0077	3E	7	7	X	X	N	N	5	N	7	N	3	N	3	3	X	X	5	N	N	N	N	3	N	N	3
#2	5	0017	3E	5	5	X	X	N	N	N	N	N	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	7
	6	S002	3E	5	5	N	X	N	N	N	N	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	7
	6	S001	3E	7	7	N	X	N	N	N	7	N	7	7	N	6	6	6	6	N	N	N	N	N	N	N	N	7
	6	Y001	3E	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7

BIK [illegible] dump fill + debris breach [illegible] to canal [illegible]

Form IW81. 11-6-14-1000 (16-1036)

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK
CONSERVATION COMMISSION
ALBANY

118 Osgo

DAM REPORT

5/24/, 1918
(Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the #2 or Upper Fulton Dam.

This dam is situated upon the Oswego River (Give name of stream) in the Town of Volney + ~~Granby~~, Oswego County, ~~about~~ in (State distance) ~~from~~ the ~~Village or~~ City of Fulton

The distance down (Up or down) stream from the dam, to the Broadway Bridge (Give name of nearest important stream or of a bridge) is about 600 ft. (State distance)

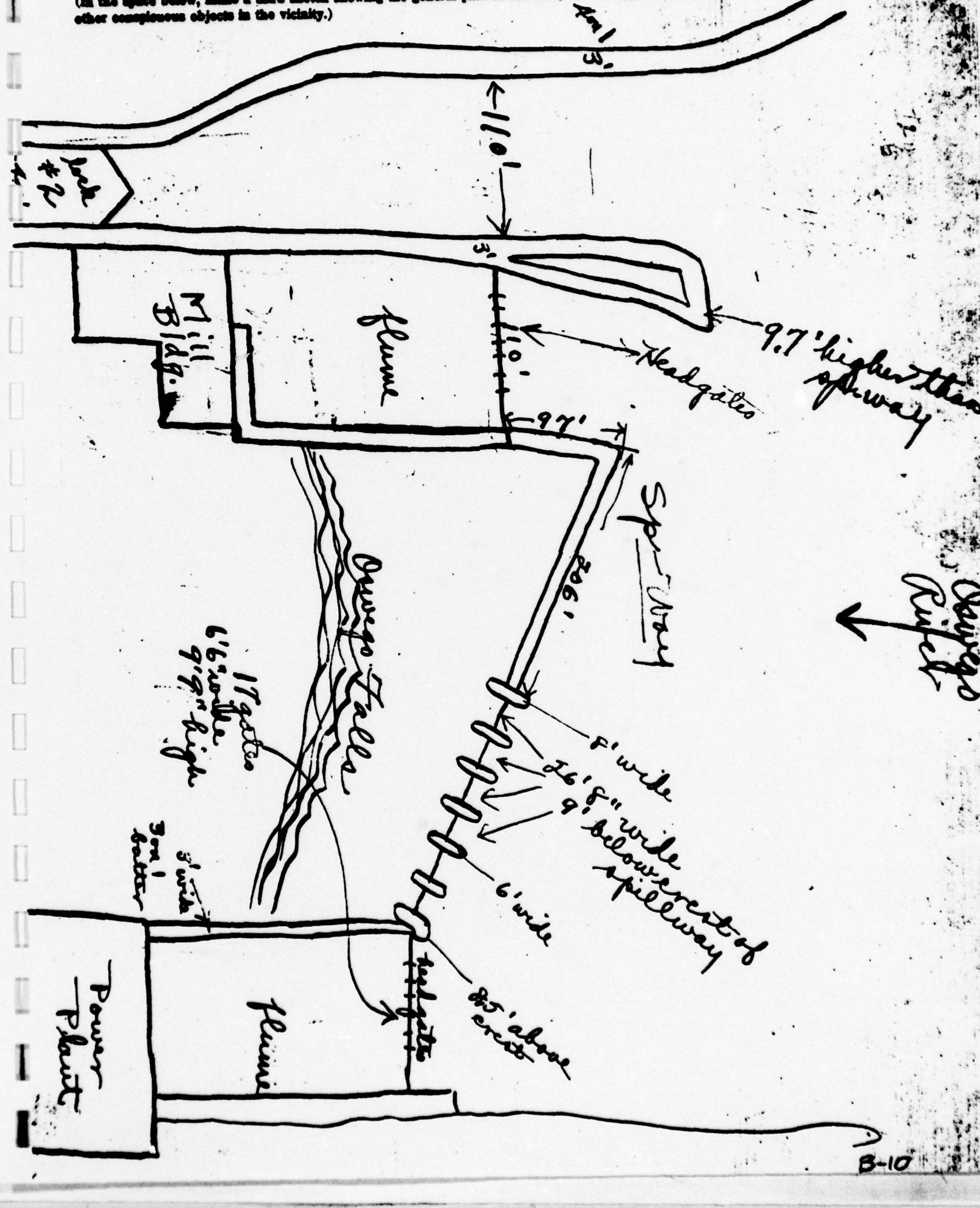
The dam is now owned by New York State (Give name and address in full) and was built in or about the year 1914, and was extensively repaired or reconstructed during the year ———

As it now stands, the spillway portion of this dam is built of concrete + Wa[illegible] (State whether of masonry, concrete or timber) and the other portions are built of concrete (State whether of masonry, concrete, earth or timber with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is solid rock and under the remaining portions such foundation bed is solid rock

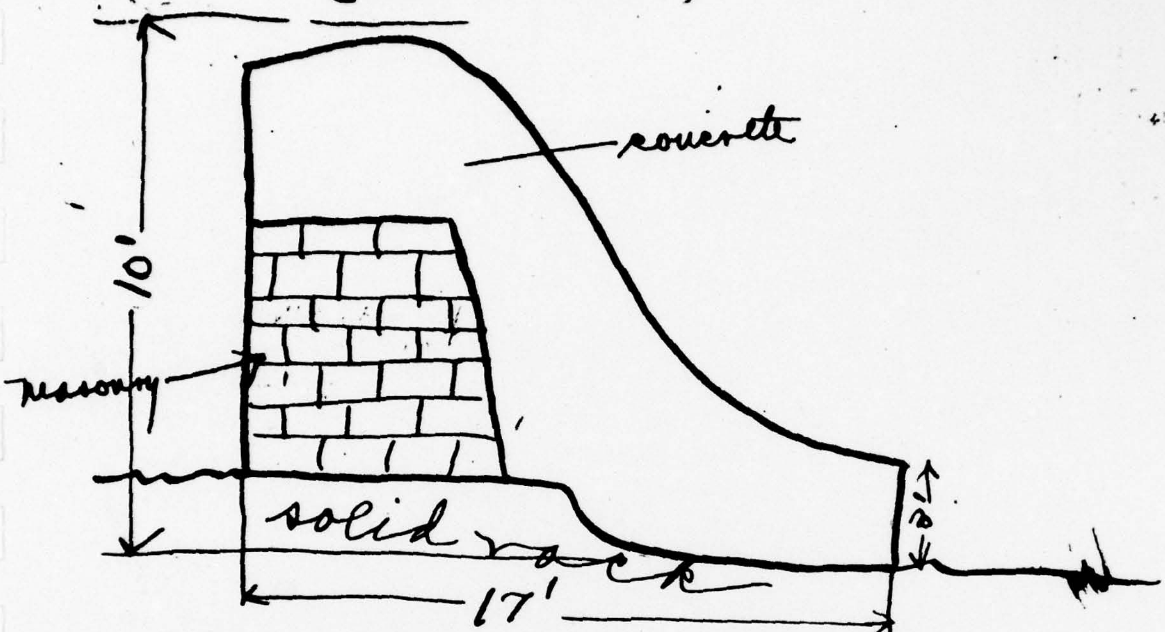
B-9

(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)

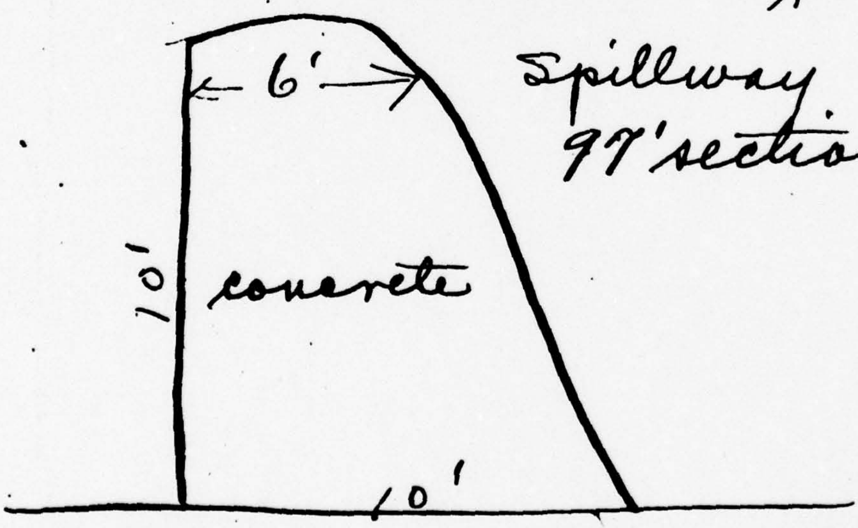


(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)

Spillway
(206' section)



Spillway
97' section



abutments are battered 4 on 1 to 2 on 1 on back and plumb on faces - width given in general view. They are from 8 to 10 ft. above the crest of the spillway —

The total length of this dam is 850 feet. The spillway or waste-weir portion, is about 303 feet long, and the crest of the spillway is about 8 to 10 feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: 6 waste gates — 9' below crest of sp way and 26' 8" wide

At the time of this inspection the water level above the dam was — ft. 6 in. ~~below~~ above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

Excellent condition. No leaks or cracks.

Reported by C. W. H. Douglass
(Signature)

115 Standart St.,
(Address—Street and number, P. O. Box or R. F. D. route)

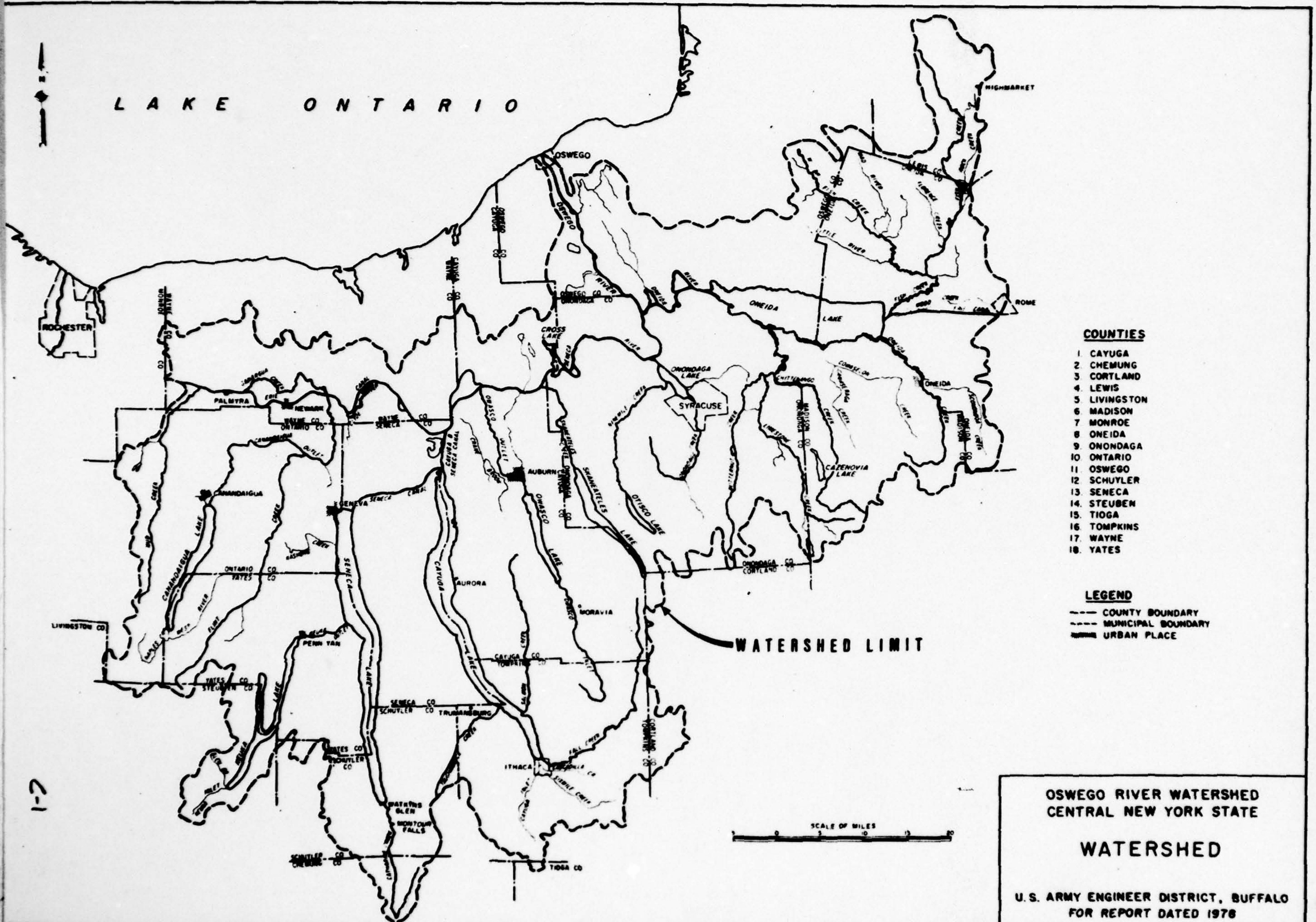
Syracuse, N.Y.
(Name of place)

B-12

APPENDIX C

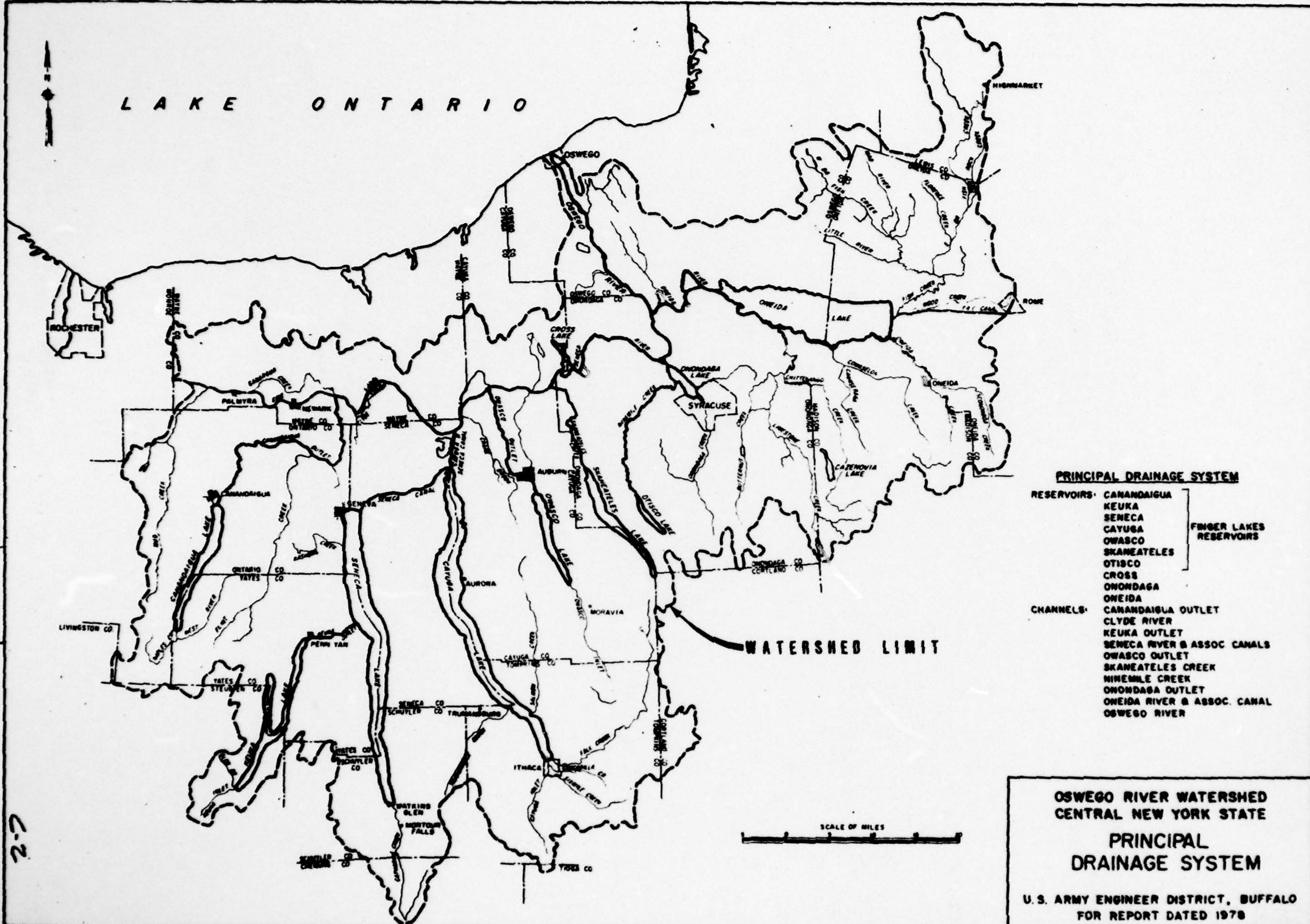
HYDROLOGIC AND HYDRAULIC COMPUTATIONS

HYDROLOGY


LAKE ONTARIO
OSWEGO
ROCHESTER
SYRACUSE
AUBURN
GENEVA
CANANDAIGUA
PENN YAN
ITHACA
AURORA
MORAVIA
TRUMANSBURG
WATKINS GLEN
MONTOUR FALLS
PALMYRA
NEWARK
ROME
HIGHMARKET
ONEIDA LAKE
ONONDAGA LAKE
CROSS LAKE
OTISCO LAKE
CAZENOVIA LAKE
SKANEATELES LAKE
OWASCO LAKE
CAYUGA LAKE
SENECA LAKE
CANANDAIGUA LAKE
WATERSHED LIMIT
LIVINGSTON CO
TIOGA CO
COUNTIES
1. CAYUGA
2. CHEMUNG
3. CORTLAND
4. LEWIS
5. LIVINGSTON
6. MADISON
7. MONROE
8. ONEIDA
9. ONONDAGA
10. ONTARIO
11. OSWEGO
12. SCHUYLER
13. SENECA
14. STEUBEN
15. TIOGA
16. TOMPKINS
17. WAYNE
18. YATES
LEGEND
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
URBAN PLACE
SCALE OF MILES
OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE
WATERSHED
U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1976

C-1

PLATE 1



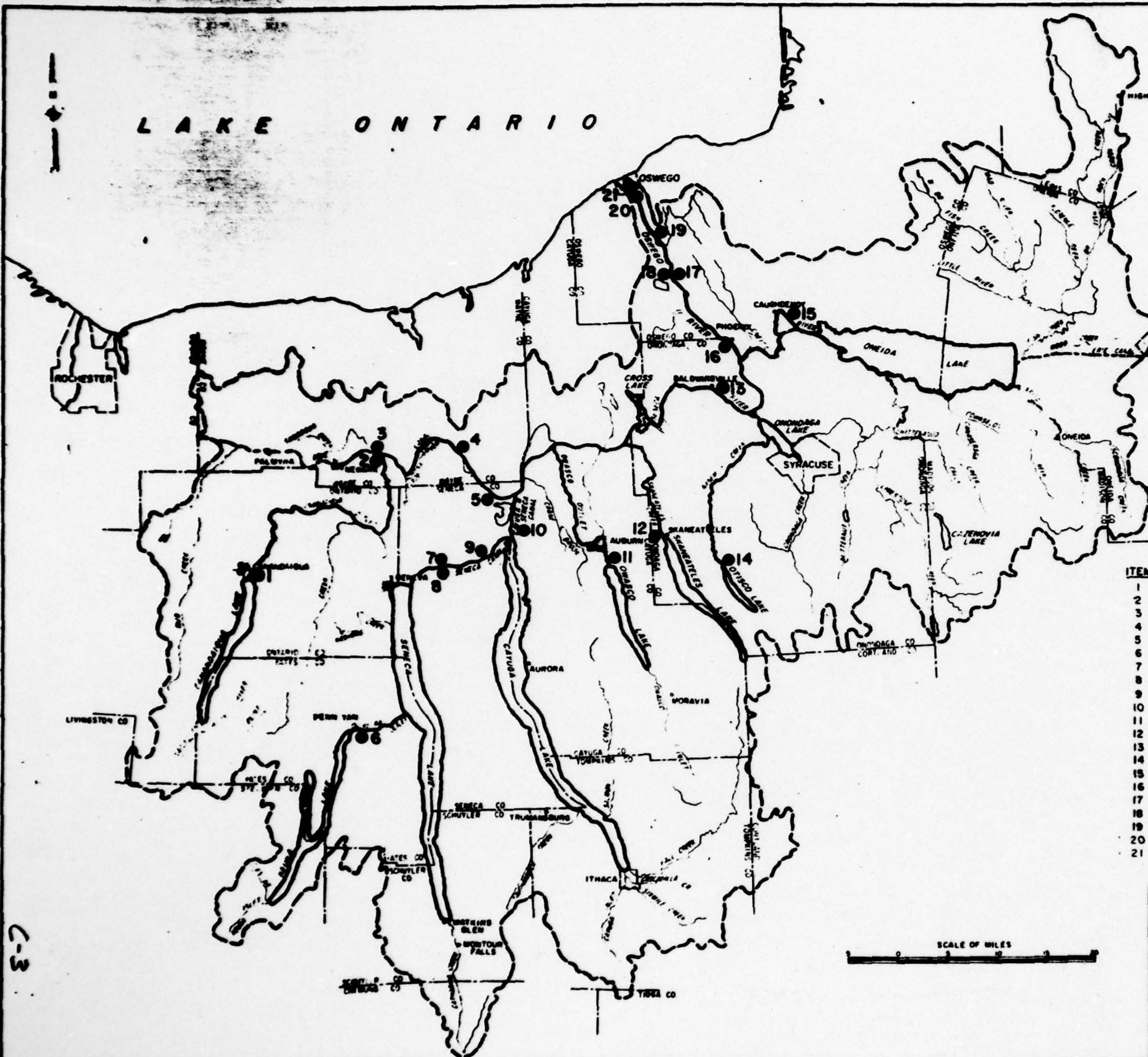
OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

PRINCIPAL
DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

PLATE 3

C-2



WATER MANAGEMENT FACILITY

ITEM	DESCRIPTION	LOCATION
1	GATED LAKE OUTLET	CANANDAIGUA
2	GATED RIVER DAM	LYONS
3	GATED RIVER DAM	LYONS
4	GATED RIVER DAM	CLYDE
5	GATED RIVER DAM	MAYS-POINT
6	GATED LAKE OUTLET	PENN YAN
7	GATED HYDRO-PLANT SPILLWAY	WATERLOO
8	GATED RIVER DAM	WATERLOO
9	GATED RIVER DAM	SENECA FALLS
10	GATED LAKE OUTLET	MUD LOCK
11	GATED LAKE OUTLET	AUBURN
12	GATED LAKE OUTLET	SKANEATELES
13	GATED RIVER DAM	BALDWINSVILLE
14	GATED LAKE OUTLET	MARIETTA
15	GATED RIVER DAM	CAUGHDENOY
16	GATED RIVER DAM	PHOENIX
17	GATED RIVER DAM	FULTON
18	GATED RIVER DAM	FULTON
19	GATED RIVER DAM	MINETTO
20	GATED RIVER DAM	OSWEGO
21	GATED RIVER DAM	OSWEGO

OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

WATER RESOURCE MANAGEMENT FACILITIES OF THE PRINCIPAL DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

PLATE 5

C-3

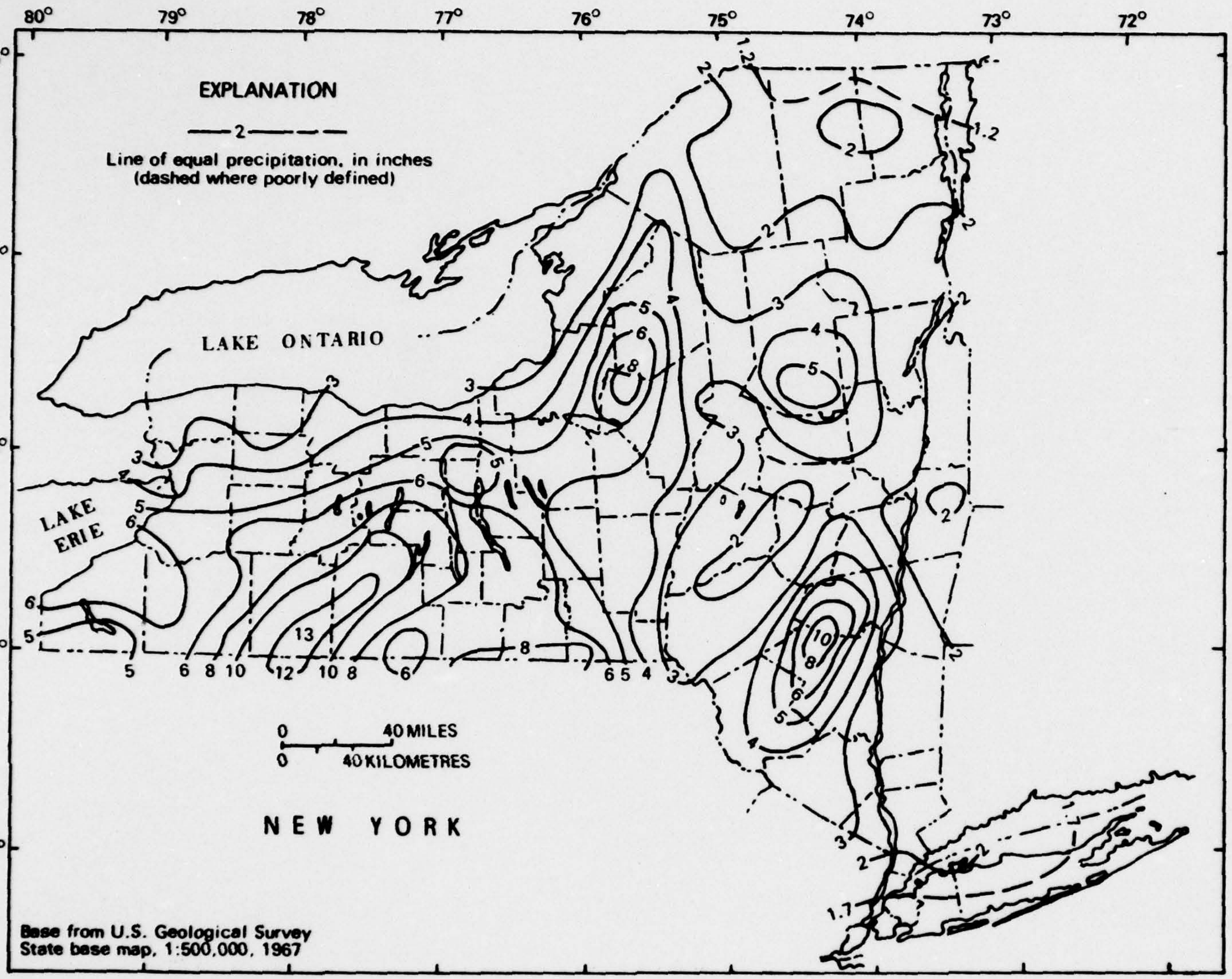
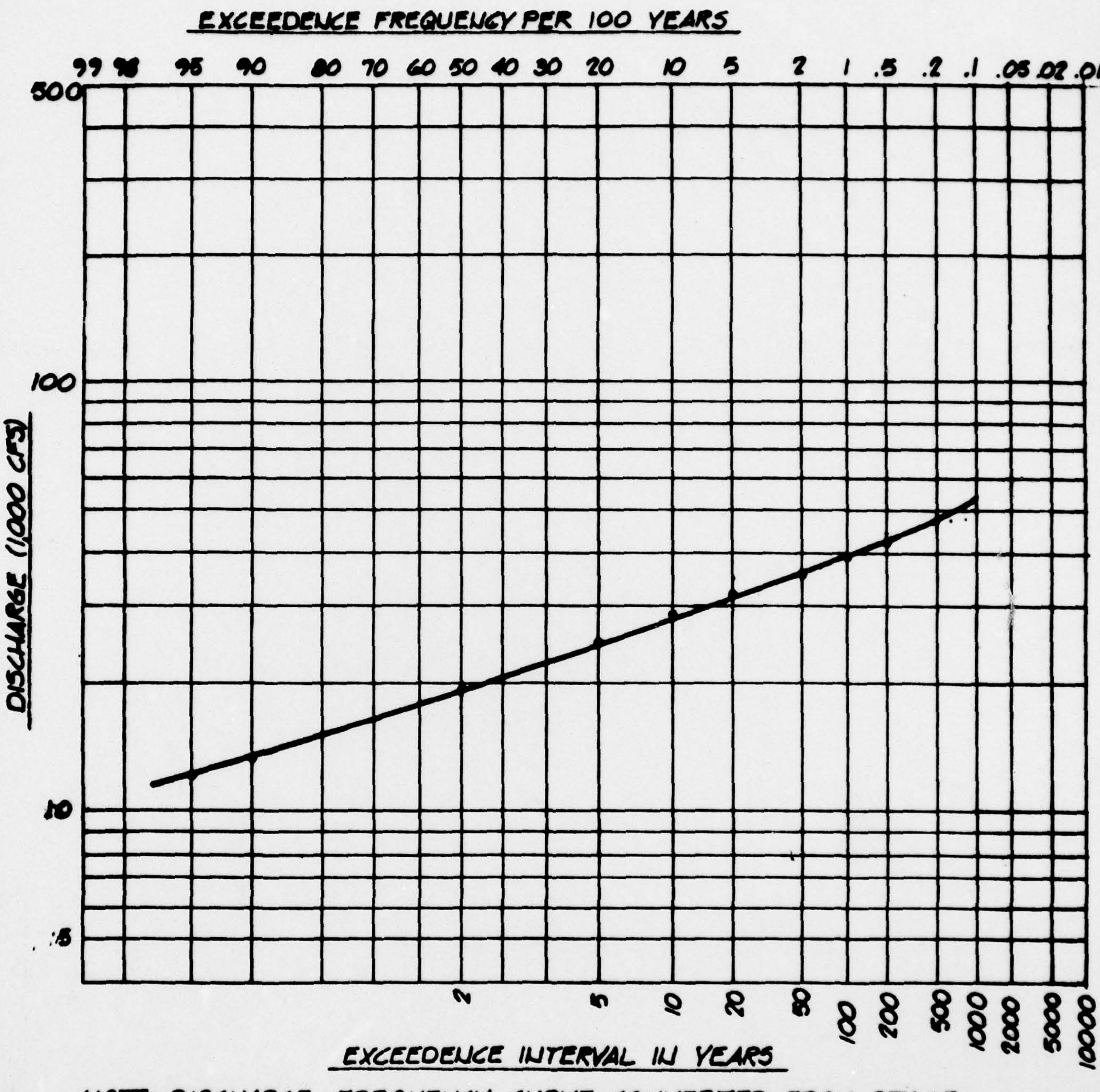


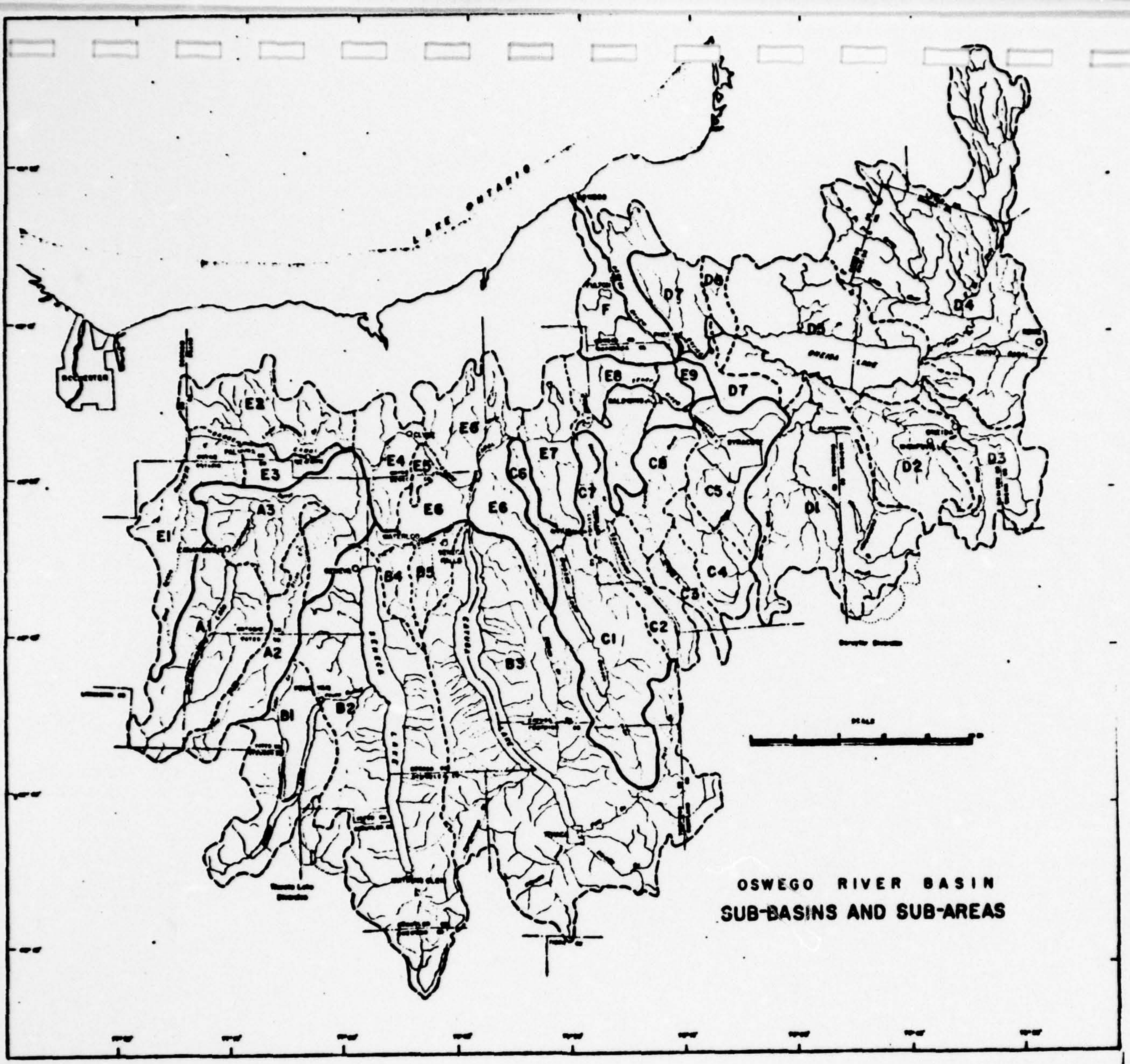
Figure 3.--Precipitation in New York, June 20-25. (Adapted from map furnished by A. B. Pack, Climatologist, National Weather Service, Ithaca, New York.)

C-4

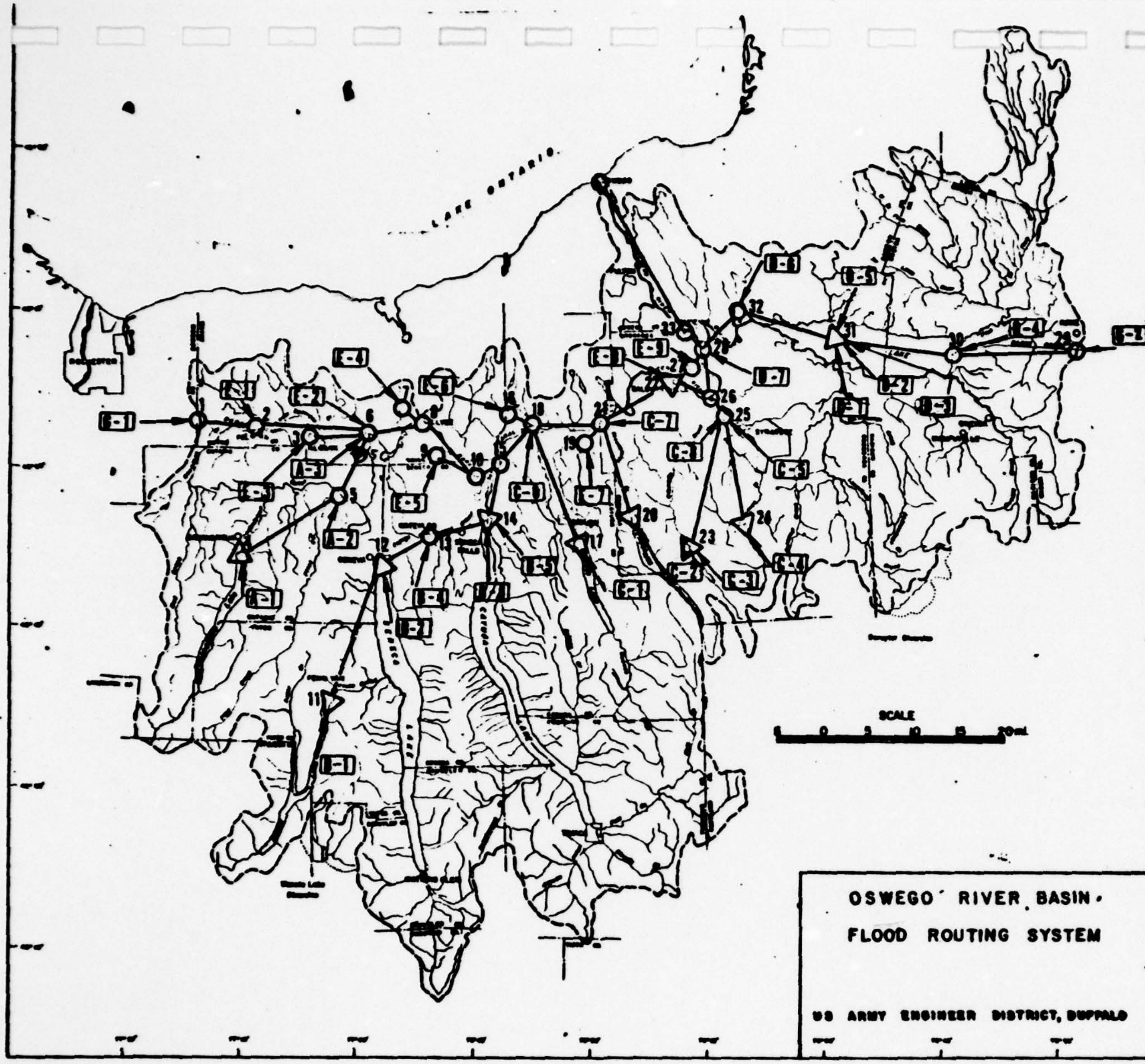


NOTE: DISCHARGE-FREQUENCY CURVE CONVERTED FROM STAGE-FREQUENCY CURVE, USING STAGE-DISCHARGE RATING CURVES DEVELOPED BY D.E.C. (FROM DEC HEC-1)

DISCHARGE - FREQUENCY CURVE

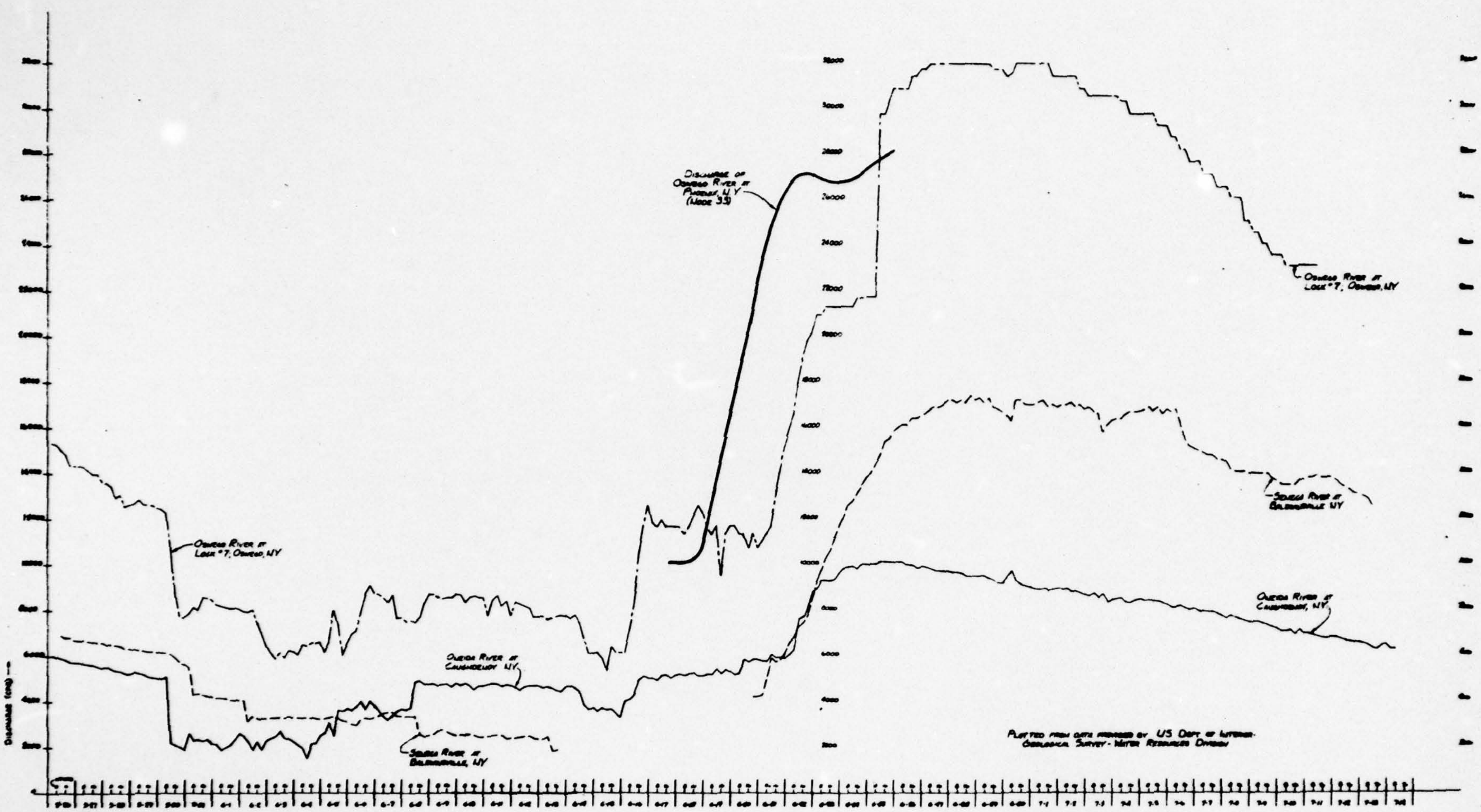


OSWEGO RIVER BASIN
SUB-BASINS AND SUB-AREAS



OSWEGO RIVER BASIN
FLOOD ROUTING SYSTEM

US ARMY ENGINEER DISTRICT, BUFFALO



— DISCHARGE CURVES —
OSWEGO RIVER WATERSHED
Water Year Ending September 1972

STETSON-DALE

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6-28-79

SUBJECT: OSWEGO RIVER CURVED DAM - LOCK #7 — PROJECT NO. 2205

DISCHARGE - FREQUENCY RANKING — DRAWN BY: JPG

WATER YR	PEAK DISCHARGE	DATE	RANKING	DISCHARGE PLOT POSI.
1936	37500 CFS	3·28·36	1	.02
1940	35000 CFS	4·10·40	2	.04
1972	32300 CFS	6·27·72	3	.06
1960	31200 CFS	4·4·60	4	.08
1950	29400 CFS	3·30·50	5	.11
1956	26800 CFS	4·13·56	6	.13
1942	25900 CFS	3·18·42	7	.15
1943	25400 CFS	5·15·43	8	.17
1947	25100 CFS	4·8·47	9	.19
1955	23600 CFS	3·23·55	10	.21
1951	23500 CFS	2·22·51	11	.23
1945	23400 CFS	3·26·45	12	.25
1939	23200 CFS	3·8·39	13	.28
1959	23100 CFS	4·6·59	14	.30
1973	23000 CFS	4·7·73	15	.32
1961	22700 CFS	2·26·61	16	.34
1971	22600 CFS	3·18·71	17	.36
1902	22500 CFS	3·13·02	18	.38
1904	22200 CFS	4·02·04	19	.40
1946	22000 CFS	10·4·46	20	.42
1963	21900 CFS	3·28·63	21	.45
1970	21600 CFS	4·6·70	22	.47
1905	21300 CFS	3·28·05	23	.49
1937	21200 CFS	4·24·37	24	.51
1969	20900 CFS	2·4·69	25	.53
1903	20300 CFS	3·35·03	26	.55
1954	20000 CFS	5·9·54	27	.57
1941	19900 CFS	4·7·41	28	.60
1974	19700 CFS	4·7·74	29	.62
1958	19100 CFS	4·23·58	30	.64
1952	18700 CFS	3·12·52	31	.66
1948	18400 CFS	3·26·48	32	.68

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PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE 6·28·79

SUBJECT: OSWEGO RIVER CURVED DAM - LOCK #7 — PROJECT NO. 2305

DISCHARGE - FREQUENCY RANKING — DRAWN BY JPG

WATER YR	PEAK DISCHARGE	DATE	RANKING	DISCHARGE PLOT POSI
1968	18100 CFS	6·30·68	33	.70
1953	18000 CFS	3·28·53	34	.72
1938	18000 CFS	3·1·38	35	.74
1966	17600 CFS	3·6·66	36	.77
1964	17500 CFS	3·18·64	37	.79
1935	16900 CFS	7·14·35	38	.81
1934	16400 CFS	4·15·34	39	.83
1949	16300 CFS	2·17·49	40	.85
1944	16000 CFS	4·14·44	41	.87
1957	15200 CFS	3·15·57	42	.89
1962	15200 CFS	3·16·62	43	.91
1906	14900 CFS	4·10·06	44	.94
1965	13200 CFS	4·26·65	45	.96
1967	12900 CFS	5·17·67	46	.98

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PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-26-79

SUBJECT EXPANSION OF STAGE - DISCHARGE CURVES TO UPPER LIMITS PROJECT NO. 230[illegible]

DRAWN BY JPS & [illegible]

SENECA LAKE $Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$ ASSUME: $n = .035$

HEIGHT	1.49/n	A	R	S	Q	STORAGE
10	42.57	10600	10	.001	66745	800000
20	42.57	21800	20	.001	248455	1200000

CANANDAIGUA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	106,500
10	42.57	10000	10	.001	62965	212,500
20	42.57	20000	20	.001	200366	319,000

KEUKA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	217000
10	42.57	10000	10	.004	111550	328550

CAYUGA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.0005	0	727000
3	42.57	15000	3	.0005	29810	854500
6	42.57	30000	6	.0005	94858	982000

OWASCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.006	0	119800
3	42.57	3000	3	.006	20,653	126500
6	42.57	6000	6	.006	65,720	152900
9	42.57	9000	9	.006	129,350	205700

AD-A077 444 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. UPPER FULTON DAM (INVENTORY NUMBER--ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

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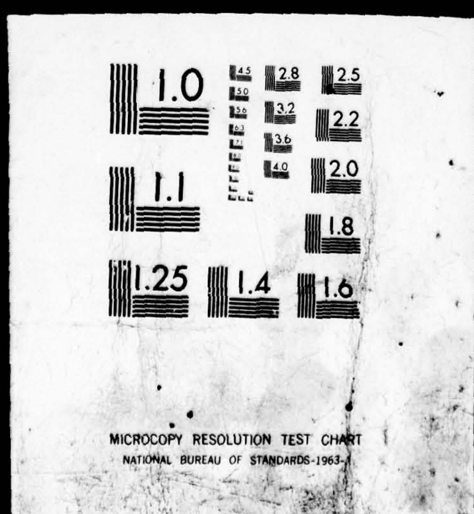

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DESIGN BRIEF

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6·27·79

SUBJECT: EXPANSION OF STAGE - DISCHARGE CURVES TO UPPER LIMITS — PROJECT NO. 2305

DRAWN BY: JPG

OTISCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	39,200
3	42.57	900	3	.004	5060	45700
6	42.57	1800	6	.004	16100	52300
9	42.57	2700	9	.004	31700	58800
12	42.57	3600	12	.004	51200	65300

ONONDAGA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	32500
3	42.57	1500	3	.001	4200	43500
6	42.57	3000	6	.001	13400	52300
9	42.57	4500	9	.001	26400	62200
12	42.57	6000	12	.001	42700	72100

ONEIDA LAKE

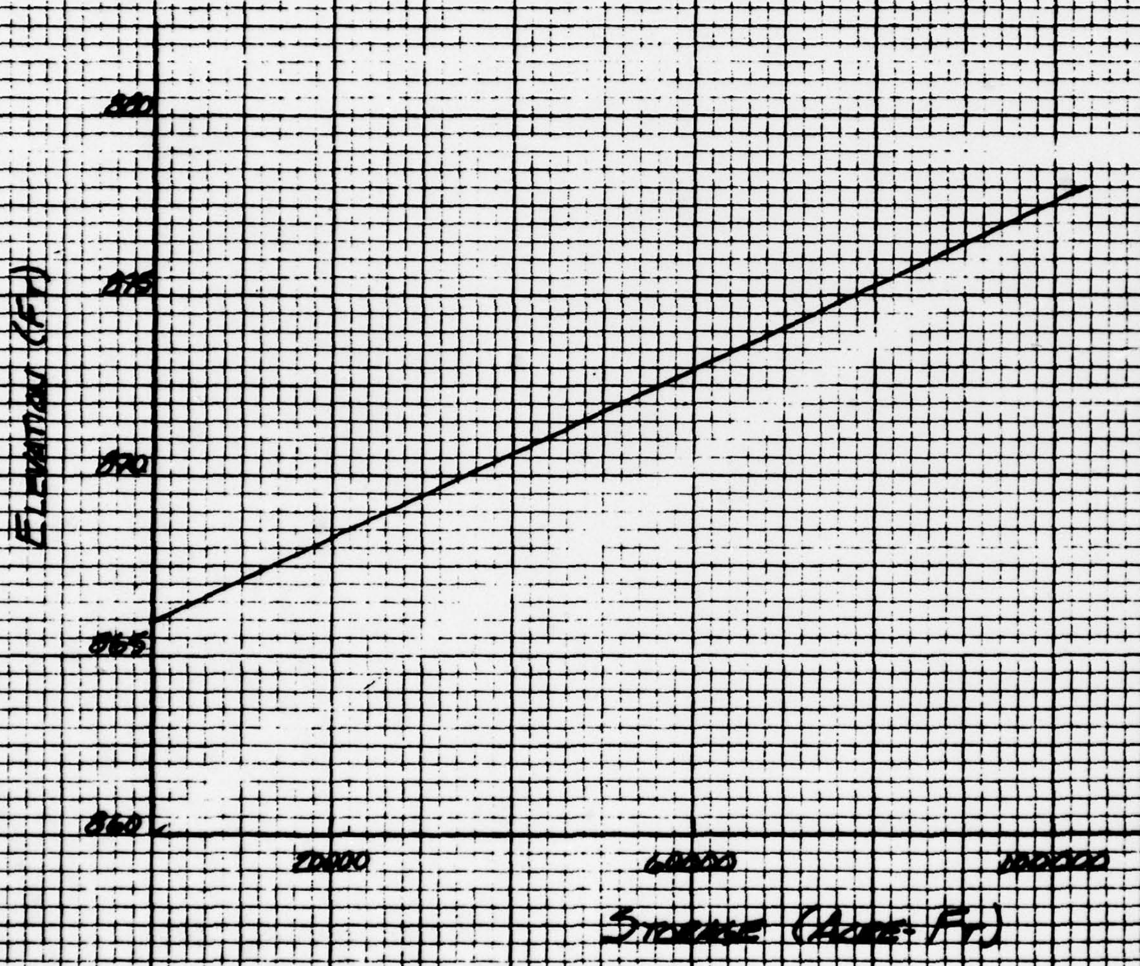
HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	845000
3	42.57	6000	3	.001	16900	998000
6	42.57	12000	6	.001	53700	1150000
9	42.57	18000	9	.001	105600	1304000

SKANEATELES LAKE

SEE SKANEATELES DAM INSPECTION REPORT DATE: SEPT 14/7[illegible]
SHEETS C-4 & C-5

SKANEATELES LAKE DAM

STAGE STORAGE



SKANEATELES REPORT
(C-4)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME: NY DAM INSPECTION — DATE: 9.15.78

SUBJECT: SKANEATELES LAKE DAM — PROJECT NO. 2210

DRAWN BY: JBG

STAGE-DISCHARGE TABULATION (FROM CREST OF SPILLWAY)

ELEV		Q PRINCIPAL SPILLWAY	Q DAM	Q TOTAL
866		—	—	—
867		124.80	—	124.80
868		352.99	—	352.99
868.5	(TOP OF DAM)	493.32	—	493.32
869		648.48	98.11	746.59
870		998.40	509.80	1508.20
871		1395.31	1096.92	2492.23
872		1834.18	1817.04	3651.22
873		2311.33	2649.00	4960.33
874		2823.90	3579.37	6403.27
875		3369.60	4598.68	7968.28
876		3946.52	5699.74	9646.26
877		4553.06	6876.88	11429.94
878		5187.84	8125.47	13313.31
879		5849.65	9441.63	15291.28
880		6537.42	10 822.06	17359.48

SKANEATELES REPORT
(C-5)

```
IA                       OSWEGO RIVER BASIN
A                             HEC1DB
A                        PMF- OVERFLOW ANALYSIS
B     40     6     0     0     0     0     0     0     4
B1     5
J      1     6     1
J1    .2    .4    .5    .6    .8   1.0
K      0     1     0     0     0     0     1
K1       1 BARGE CANAL LOCK 30 AT MACEDON  (SUB AREA A1)
M     -1     0   100     0  5100     0     0     0     1
N    372   372   372   372   374   378   379   379   386   392
N    390   380   375   372   113    23    25    21    21    22
N     22    21    22    22    21    21    22    22    22     0
N
K      1     2     0     0     0     0     1
K1       2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)
Y      0     0     0     0     1
Y1     0     3     1
K      0     2     0     0     0     0     1
K1       3 GANARGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)
M      1    -1   147     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0   0.5  0.05
U     21
I    514  1946  2950  2655  1970  1472  1095   815  515.   389
I    366   250   186   130   103    76    57    42    25    25
I     21
X    140   550   1.6
K      2     2     0     0     0     0     1
K1       4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29
K      1     6     0     0     0     0     1
K1       5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS
Y      0     0     0     0     1
Y1     0     8     3
K      0     6     0     0     0     0     1
K1       6 LOWER CANARAGUAL LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)
M      1    -1   118     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0   0.5  0.05
U     27
I     28   109   293   523   696   773   896   980  1246  1312
I   1218   979   764   596   465   363   283   221   173   135
I    105    82    64    50    39    35    35
X    120   470   1.6
K      2     6     0     0     0     0     1
K1       7 COMBINED AND LOCAL FLOWS AT LOCK 27
K      0     3     0     0     0     0     1
K1       8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)
M      1    -1    51     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0   0.5  0.05
U     10
I   2001  1630   844   383   174    79    36    30    25    16
X    100   200   1.6
K      1     6     0     0     0     0     1
```

```
K1       9 ROUTED FLOW E-3 TO LYONS (NODE 6)
Y       0       0       0       0       1
Y1      0       5       2
K       2       6       0       0       0       0       1
K1      10 COMBINE FLOWS AT NODE 6
K       0       4       0       0       0       0       1
K1      11 CANANDAIGUA LAKE INFLOW
M       1      -1     184       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0    1.25    0.03
U       8
1    8556    5103    3260    1507     691     316     145      30
X     300    1000     1.6
K       1       4       0       0       0       0       1
K1      12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD
Y       0       0       0       1       1
Y1      0       0       0       0       0       0   51000
Y2  10700   21300   31900   42500   53100   63700   74300   84900   95500  106100
Y2 212500  319000
Y3     50      50      50      50     200     600    1000    1560    2250    3000
Y3  63000  200366
K       1       5       0       0       0       0       1
K1      13 ROUTED OUTFLOW TO FLINT CREEK MOUTH
Y       0       0       0       0       1
Y1      0      12       5
K       0       5       0       0       0       0       1
K1      14 FLINT CREEK INFLOW A-2
M       1      -1     102       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.06
U      26
1      93     534     903    1266    1367    1166     966     801     663     549
1     455     377     311     259     215     178     147     104     101      84
1      69      57      47      39      35      32
X      90    2000     1.6
K       2       5       0       0       0       0       1
K1      15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS
K       1      56       0       0       0       0       1
K1      16 OUTLET ROUTED TO LOCK 27
Y       0       0       0       0       1
Y1      0       7       3
K       0      56       0       0       0       0       1
K1      17 OUTLET LOCAL FLOW A-3
M       1      -1     155       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.6    0.06
U      22
1      91     338     905    1348    1718    2408    2601    1921    1413    1038
1     763     562     412     303     223     164     120      90      65      48
1      35      34
X     150     200     1.6
K       2      56       0       0       0       0       1
K1      18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27
K       1       6       0       0       0       0       1
K1      19 ROUTE OUTLET TO CANAL
Y       0       0       0       0       1
Y1      0       1
K       2       6       0       0       0       0       1
K1      20 COMBINE FLOW AT 6(OUTLET FLOW + E-1, E-2, E-3)
K       1       8       0       0       0       0       1
K1      21 ROUTE FLOWS AT LOCK 27 TO NODE 8
Y       0       0       0       0       1
Y1      0       8       3
K       0       7       0       0       0       0       1
K1      22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)
M       1      -1      89       0    5100       0       0       0       1
```

```
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.06
U     23
1    897   1670   1441   1144    900    721    572    454    361    287
1    227    181    143    114     90     72     57     45     36     29
1     23     23     23
X    100    360    1.6
K      1      8      0      0      0      0      1
K1      23 ROUTE FLOWS AT LOCK 26 TO NODE 8
Y      0      0      0      0      1
Y1     0      2
K      2      8      0      0      0      0      1
K1      24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8
K      1     10      0      0      0      0      1
K1      25 ROUTE FLOWS AT NODE 8 TO NODE 10
Y      0      0      0      0      1
Y1     0      5      2
K      0      9      0      0      0      0      1
K1      26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)
M      1     -1     18      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.06
U     21
1    171    304    313    246    193    152    119     93     73     58
1     45     35     28     22     17     13     11      8      6      5
1      4
X     90     90    1.6
K      1     10      0      0      0      0      1
K1      27 ROUTE INFLOW E-5 TO NODE 10
Y      0      0      0      0      1
Y1     0      2
K      2     10      0      0      0      0      1
K1      28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10
K      1     15      0      0      0      0      1
K1      29 ROUTE FLOWS AT NODE 10 TO NODE 15
Y      0      0      0      0      1
Y1     0      5      2
K      0     11      0      0      0      0      1
K1      30 LOCAL INFLOW B-1 INTO KEUKA LAKE
M      1     -1    183      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0   1.50   0.03
U      6
1  14318   3342   1273    403    183      0
X    100    800    1.6
K      1     11      0      0      0      0      1
K1      31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS
Y      0      0      0      1      1
Y1     0      0      0      0      0      0 147000
Y2107000 129500 141000 153500 172000 178000 191000 204000 217000
Y2320550
Y3   120    320    445    530    575    670    890   1130   1470
Y3126000
K      1     12      0      0      0      0      1
K1      32 ROUTE KEUKA LAKE OUTFLOWS TO 12
Y      0      0      0      0      1
Y1     0      6      2
K      0     12      0      0      0      0      1
K1      33 SENECA LAKE INFLOWS B-2
M      1     -1    524      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    0.5   0.03
U     12
1  26993  10831   6899   4332   2720   1700   1072    673    422    266
1    167     70
X    500   2000    1.6
[illegible]
```

```
K     2    12     0     0     0     0     1
K1       34 COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS
K     1    12     0     0     0     0     1
K1       35 SENECA LAKE OUTFLOWS - MODIFIED  PULS METHOD
Y     0     0     0     1     1
Y1                                   534000
Y2372000 414000 456000 500000 543000 586000 630000 650000 674000 720000
Y2000000 1200000
Y3   700    700    700    700    700    700    700   1000   3000   3000
Y3 15000  77000
K     1    13     0     0     0     0     1
K1       36 SENECA LAKE OUTFLOWS ROUTED TO 13
Y     0     0     0     0     1
Y1    0     2
K     0    13     0     0     0     0     1
K1       37 LOCAL INFLOW B-4
M     1    -1    39     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.05
U    15
1   539  1094   796   549   378   260   179   123    85    58
1    40    20    19    11    11
I    92   200   1.6
K     2    13     0     0     0     0     1
K1       38 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4
K     1    14     0     0     0     0     1
K1       39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)
Y     0     0     0     0     1
Y1    0     6     2
K     0    14     0     0     0     0     1
K1       40 LOCAL INFLOW B-5
M     1    -1    36     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.05
U    12
1   895  1094   692   437   277   175   110    70    44    28
1    14    10
I    92   200   1.6
K     2    14     0     0     0     0     1
K1       41 COMBINE FLOW B-5 WITH ROUTED FLOW
K     0    14     0     0     0     0     1
K1       42 CAYUGA LAKE INFLOW B-3
M     1    -1   782     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.03
U    15
1 24903 15540 13526  9524  6529  4476  3069  2104  1443   989
1   678   465   319   219    81
I  1000  1700   1.6
K     2    14     0     0     0     0     1
K1       43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW
K     1    14     0     0     0     0     1
K1       44 CAYUGA LAKE OUTFLOW - MODIFIED PULS
Y     0     0     0     1     1
Y1    0     0     0     0     0     0 490000
Y2375000 417000 460000 503000 546000 589500 634000 660000 727000
Y2054500 982000
Y3  1700   1700   1700   1700   3400   3400   3400   8700   8700
Y3 30510 103500
K     1    15     0     0     0     0     1
K1       45 ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15
Y     0     0     0     0     1
Y1    0     3     1
K     2    15     0     0     0     0     1
K1       46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15
K     1    18     0     0     0     0     1
```

```
KI      47 ROUTE FLOWS TO NODE 18
Y       0       0       0       0       1
Y1      0       8       3
K       0      16       0       0       0       0       1
KI      48 LOCAL FLOW E-6
M       1      -1     191       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.06
U      16
1    3051    5102    3130    2469    1710    1175     800     555     381     262
1     100     123      85      75      70      27
I     140     400     1.6
K       1      18       0       0       0       0       1
KI      49 ROUTE LOCAL FLOW E-6 TO NODE 18
Y       0       0       0       0       1
Y1      0       2
K       2      18       0       0       0       0       1
KI      50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18
K       0      17       0       0       0       0       1
KI      51 HEAD OWASCO INFLOW C-1
M       1      -1     201       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0    0.75     .05
U      10
1    6633    5870    4280    2273    1200     633     334     176      93      30
I     450    1000     1.6
K       1      17       0       0       0       0       1
KI      52 OWASCO LAKE INFLOWS - MODIFIED PULS METHOD
Y       0       0       0       1       1
Y1      0       0       0       0       0       0   92000
Y2  66000   73200   79900   86500   93200   99800  106500  113200  119800  126500
Y2152900  205700
Y3    600     600     600    1100    1700    2300    2840    3400    3400    3400
Y3  24000   69100
K       1      18       0       0       0       0       1
KI      53 ROUTE OWASCO LAKE OUTLET FLOWS
Y       0       0       0       0       1
Y1      0       7       3
K       2      18       0       0       0       0       1
KI      54 COMBINE FLOWS WITH FLOWS AT NODE 18
K       0      18       0       0       0       0       1
KI      55 READ LOCAL FLOW C-6
M       1      -1      19       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.06
U      18
1     157     368     352     268     205     156     119      91      70      53
1      40      26      23      18      14      10       8       6
I      90     200     1.6
K       2      18       0       0       0       0       1
KI      56 COMBINE  LOCAL FLOW C-6 WITH FLOW AT NODE 18
K       1      21       0       0       0       0       1
KI      57 ROUTE FLOW AT 18 TO NODE 21
Y       0       0       0       0       1
Y1      0       7       3
K       0      19       0       0       0       0       1
KI      58 LOCAL INFLOW E-7
M       1      -1      98       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.06
U      11
1    2769    3130    1870    1115     664     396     236     141      84      50
1      19
I     120     400     1.6
K       1      21       0       0       0       0       1
KI      59 ROUTE LOCAL FLOW TO NODE 21
```

```
Y    0     0     0     0     1
Y1   0     6     2
K    2    21     0     0     0     0     1
K1      60 COMBINE ROUTED FLOW WITH FLOW AT 21
K    0    20     0     0     0     0     1
K1      61 SKANEATELES LAKE INFLOWS
M    1    -1    74     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0  0.75  0.05
U    5
1 6039   791   232    56    10
X  250   500   1.6
K    1    20     0     0     0     0     1
K1      62 SKANEATELES LAKE OUTFLOWS
Y    0     0     0     1     1
Y1   0     0     0     0     0     0     0
Y2   0 17323 34756 52184 104368 208736 243492
Y3   0   353   747  1508  6403 13313 17359
K    1    21     0     0     0     0     1
K1      63 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21
Y    0     0     0     0     1
Y1   0     6     2
K    2    21     0     0     0     0     1
K1      64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21
K    0    21     0     0     0     0     1
K1      65 LOCAL FLOW C-7
M    1    -1    27     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.06
U   11
1  496   946   581   351   212   127    77    46    28    17
1    7
X   90   200   1.6
K    2    21     0     0     0     0     1
K1      66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21
K    1    22     0     0     0     0     1
K1      67 ROUTING TO NODE 22
Y    0     0     0     0     1
Y1   0     4     1
K    0    22     0     0     0     0     1
K1      68  LOCAL FLOW E-8
M    1    -1    98     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.06
U    7
1 4087  3059  1402   642   259   135    42
X  120   400   1.6
K    2    22     0     0     0     0     1
K1      69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22
K    1    22     0     0     0     0     1
K1      70 BALDWINSVILLE POOL - MODIFIED PULS METHOD
Y    0     0     0     1     1
Y1   0     0     0     0     0     0  3250
Y2 3250  5000  8400 10000 11700 14000 17000 20000 24000 30000
Y3 3000  4000  6000  8000 10000 12000 14000 15300 16600 17000
K    1    26     0     0     0     0     1
K1      71 ROUTE FLOW TO NODE 26
Y    0     0     0     0     1
Y1   0     4     1
K    0    23     0     0     0     0     1
K1      72 INFLOW TO OTISCO LAKE C-3
M    1    -1  42.7     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0  0.75  0.05
U    6
1 3092   913   397   139    55     9
```

```
X     90    300    1.6
K      1     23      0      0      0      0      1
K1        73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD
Y      0      0      0      1      1
Y1     0      0      0      0      0      0  29300
Y2 19600  21000  23900  26100  28300  30500  32600  34800  37000  39200
Y2 45700  52300  58800  65300
Y3   200    200    200    200    200    400    900   1600   2000   2000
Y3  7060  18100  33700  53200
K      1     25      0      0      0      0      1
K1        74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25
Y      0      0      0      0      1
Y1     0     10      4
K      0     24      0      0      0      0      1
K1        75 INFLOW INTO ONONDACA RESERVOIR   C-4
M      1     -1     68      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    1.5   0.06
U      6
1   2018   3341   1250    435    151     57
X    250    300    1.6
K      1     24      0      0      0      0      1
K1        76 ROUTE ONONDACA RESERVOIR - MODIFIED PULS METHOD
Y      0      0      0      1      1
Y1     0      0      0      0      0      0      0
Y2     0    100    700   1980   3500   7940  18200  22200  27000  32500
Y2 43400  52300  62200  72100
Y3    80    430    660    880   1070   1420   1770   1840   2000   2000
Y3  6200  15400  28400  44700
K      1     25      0      0      0      0      1
K1        77 ROUTE ONONDACA RESERVOIR OUTFLOWS TO NODE 25
Y      0      0      0      0      1
Y1     0      8      3
K      2     25      0      0      0      0      1
K1        78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25
K      0     25      0      0      0      0      1
K1        79 LOCAL INFLOW C-5
M      1     -1    102      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0   1.25   0.06
U     11
1   2671   3269   2030   1215    727    436    261    156     77     56
1     27
X    250    500    1.6
K      2     25      0      0      0      0      1
K1        80 COMBINE ROUTED FLOWS, LOCAL INFLOW
K      0     25      0      0      0      0      1
K1        81 LOCAL FLOW C-8
M      1     -1     72      0   5100      0      0      0      1
P      0   21.5     33     47     55     65     72     74
T      0      0      0      0      0      0    1.0    .06
U     14
1    459   1455   1854   1454    926    590    376    239    152     97
1     62     39     25     12
X    250    300    1.6
K      2     25      0      0      0      0      1
K1        82 COMBINE LOCAL FLOW AT NODE 25
K      1     26      0      0      0      0      1
K1        83 ROUTE FLOWS TO NODE 26
Y      0      0      0      0      1
Y1     0      8      3
K      2     26      0      0      0      0      1
K1        84 COMBINE ROUTED FLOW AND FLOW AT NODE 26
K      1     28      0      0      0      0      1
K1        85 ROUTE FLOWS TO NODE 28 (THREE RIVERS)
Y      0      0      0      0      1
```

```
Y1    0     6     2
K     0    27     0     0     0     0     1
K1      86 LOCAL FLOW  (E-9)  AT NODE 27
M     1    -1    37     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U     6
1  2140  1119   437   171    67    11
I   100   150   1.6
K     1    28     0     0     0     1
K1      87 ROUTE LOCAL FLOW E-9 TO NODE 28
Y     0     0     0     0     1
Y1    0     3     1
K     2    28     0     0     0     0     1
K1      88 COMBINE HYDROGRAPHS AT 28
K     0    29     0     0     0     0     1
K1      89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN   (C-2)
M    -1     0   100     0  5100     0     0     0     1
M
M
M
M
K     1    30     0     0     0     0     1
K1      90 ROUTE FLOW AT NODE 29 TO NODE 30
Y     0     0     0     0     1
Y1    0     7     3
K     0    30     0     0     0     0     1
K1      91 LOCAL INFLOW D-4
M     1    -1   529     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    15
1   940  4797 11098 12780 10280  6513  4014  2473  1524   939
1   579   356   220   140   102
I   800  3960   1.6
K     2    30     0     0     0     0     1
K1      92 COMBINE LOCAL FLOW WITH ROUTED FLOW
K     1    31     0     0     0     0     1
K1      93 ROUTE FLOWS TO NODE 31
Y     0     0     0     0     1
Y1    0     1
K     0    31     0     0     0     0     1
K1      94 LOCAL FLOW D-3
M     1    -1   144     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    24
1   370  1076  2155  2396  2356  1742  1289   953   705   522
1   386   286   183   156   115    85    63    47    34    30
1    30    30    30    24
I   320  1000   2.0
K     2    31     0     0     0     0     1
K1      95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1      96 LOCAL FLOW D-2
M     1    -1   105     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    14
1   353  1062  2750  2357  1404   929   581   363   227   142
1    89    49    35    18
I   240   800   1.6
K     2    31     0     0     0     0     1
K1      97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1      98 LOCAL FLOW D-1
```

```
M     1    -1   280     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    24
1   103   504  1042  1512  2516  3758  4112  4139  3602  2645
1  1916  1204   866   727   527   320   276   200   145   105
1    76    55    50    50
I   600  2160   1.6
K     2    31     0     0     0     0     1
K1      99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1     100 LOCAL FLOW D-5
M     1    -1   269     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.05
U    12
1 12227  5835  4245  2585  1574   958   583   355   216   132
1    80    36
I   540  2000   1.6
K     2    31     0     0     0     0     1
K1     101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31
K     1    31     0     0     0     0     1
K1     102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD
Y     0     0     0     1     1
Y1    0     0     0     0     0     0 670000
Y2442000 635000 640000 650000 680000 735000 806000 845000
Y2990000 1150000 1304000
Y3 1000  1000  2000  4000  6000  8000 10000 11000
Y3 27900 64700 116600
K     1    32     0     0     0     0     1
K1     103 ROUTE FLOWS TO NODE 32
Y     0     0     0     0     1
Y1    0     1
K     0    32     0     0     0     0     1
K1     104 LOCAL FLOW D-6
M     1    -1    28     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U    15
1   274   531   681   491   338   233   160   110    76    53
1    36    25    18    12     7
I    70   210   1.6
K     2    32     0     0     0     0     1
K1     105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32
K     1    28     0     0     0     0     1
K1     106 ROUTE FLOW AT 32 TO NODE 28
Y     0     0     0     0     1
Y1    0     6     2
K     2    28     0     0     0     0     1
K1     107 COMBINE ROUTED FLOW WITH FLOW AT NODE 28
K     0    28     0     0     0     0     1
K1     108 LOCAL FLOW D-7
M     1    -1   110     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    77
T     0     0     0     0     0     0   0.5  0.06
U    24
1   602  1403  1808  1872  1496  1127   849   536   482   363
1   273   206   155   117    88    67    50    38    28    22
1    20    20    20     0
I   250   800   2.0
K     2    28     0     0     0     1     1
K1     109 COMBINE WITH FLOW AT NODE 28
K     1    33     0     0     0     1     1
K1     110 ROUTE FLOW AT 28 TO NODE 33
Y     0     0     0     0     1
Y1    0     3     1
```

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DROUT      14:31 JUN 27,'79

1*******************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 *******************************
1                                 PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                          RUNOFF HYDROGRAPH AT          1
                                          ROUTE HYDROGRAPH TO           2
                                          RUNOFF HYDROGRAPH AT          2
                                          COMBINE  2 HYDROGRAPHS AT     2
                                          ROUTE HYDROGRAPH TO           6
                                          RUNOFF HYDROGRAPH AT          6
                                          COMBINE  2 HYDROGRAPHS AT     6
                                          RUNOFF HYDROGRAPH AT          3
                                          ROUTE HYDROGRAPH TO           6
                                          COMBINE  2 HYDROGRAPHS AT     6
                                          RUNOFF HYDROGRAPH AT          4
                                          ROUTE HYDROGRAPH TO           4
                                          ROUTE HYDROGRAPH TO           5
                                          RUNOFF HYDROGRAPH AT          5
                                          COMBINE  2 HYDROGRAPHS AT     5
                                          ROUTE HYDROGRAPH TO          56
                                          RUNOFF HYDROGRAPH AT         56
                                          COMBINE  2 HYDROGRAPHS AT    56
                                          ROUTE HYDROGRAPH TO           6
                                          COMBINE  2 HYDROGRAPHS AT     6
                                          ROUTE HYDROGRAPH TO           8
                                          RUNOFF HYDROGRAPH AT          7
                                          ROUTE HYDROGRAPH TO           8
                                          COMBINE  2 HYDROGRAPHS AT     8
                                          ROUTE HYDROGRAPH TO          10
                                          RUNOFF HYDROGRAPH AT          9
                                          ROUTE HYDROGRAPH TO          10
                                          COMBINE  2 HYDROGRAPHS AT    10
                                          ROUTE HYDROGRAPH TO          15
                                          RUNOFF HYDROGRAPH AT         11
                                          ROUTE HYDROGRAPH TO          11
                                          ROUTE HYDROGRAPH TO          12
                                          RUNOFF HYDROGRAPH AT         12
                                          COMBINE  2 HYDROGRAPHS AT    12
                                          ROUTE HYDROGRAPH TO          12
                                          ROUTE HYDROGRAPH TO          13
                                          RUNOFF HYDROGRAPH AT         13
                                          COMBINE  2 HYDROGRAPHS AT    13
                                          ROUTE HYDROGRAPH TO          14
                                          RUNOFF HYDROGRAPH AT         14
                                          COMBINE  2 HYDROGRAPHS AT    14
                                          RUNOFF HYDROGRAPH AT         14
                                          COMBINE  2 HYDROGRAPHS AT    14
                                          ROUTE HYDROGRAPH TO          14
                                          ROUTE HYDROGRAPH TO          15
                                          COMBINE  2 HYDROGRAPHS AT    15
                                          ROUTE HYDROGRAPH TO          18
                                          RUNOFF HYDROGRAPH AT         16
                                          ROUTE HYDROGRAPH TO          18
                                          COMBINE  2 HYDROGRAPHS AT    18
                                          RUNOFF HYDROGRAPH AT         17
                                          ROUTE HYDROGRAPH TO          17
                                          ROUTE HYDROGRAPH TO          18
                                          COMBINE  2 HYDROGRAPHS AT    18
                                          RUNOFF HYDROGRAPH AT         18
```

```
COMBINE  2 HYDROGRAPHS AT    18
ROUTE HYDROGRAPH TO          21
RUNOFF HYDROGRAPH AT         19
ROUTE HYDROGRAPH TO          21
COMBINE  2 HYDROGRAPHS AT    21
RUNOFF HYDROGRAPH AT         20
ROUTE HYDROGRAPH TO          20
ROUTE HYDROGRAPH TO          21
COMBINE  2 HYDROGRAPHS AT    21
RUNOFF HYDROGRAPH AT         21
COMBINE  2 HYDROGRAPHS AT    21
ROUTE HYDROGRAPH TO          22
RUNOFF HYDROGRAPH AT         22
COMBINE  2 HYDROGRAPHS AT    22
ROUTE HYDROGRAPH TO          22
ROUTE HYDROGRAPH TO          26
RUNOFF HYDROGRAPH AT         23
ROUTE HYDROGRAPH TO          23
ROUTE HYDROGRAPH TO          25
RUNOFF HYDROGRAPH AT         24
ROUTE HYDROGRAPH TO          24
ROUTE HYDROGRAPH TO          25
COMBINE  2 HYDROGRAPHS AT    25
RUNOFF HYDROGRAPH AT         25
COMBINE  2 HYDROGRAPHS AT    25
RUNOFF HYDROGRAPH AT         25
COMBINE  2 HYDROGRAPHS AT    25
ROUTE HYDROGRAPH TO          26
COMBINE  2 HYDROGRAPHS AT    26
ROUTE HYDROGRAPH TO          28
RUNOFF HYDROGRAPH AT         27
ROUTE HYDROGRAPH TO          28
COMBINE  2 HYDROGRAPHS AT    28
RUNOFF HYDROGRAPH AT         29
ROUTE HYDROGRAPH TO          30
RUNOFF HYDROGRAPH AT         30
COMBINE  2 HYDROGRAPHS AT    30
ROUTE HYDROGRAPH TO          31
RUNOFF HYDROGRAPH AT         31
COMBINE  2 HYDROGRAPHS AT    31
RUNOFF HYDROGRAPH AT         31
COMBINE  2 HYDROGRAPHS AT    31
RUNOFF HYDROGRAPH AT         31
COMBINE  2 HYDROGRAPHS AT    31
RUNOFF HYDROGRAPH AT         31
COMBINE  2 HYDROGRAPHS AT    31
ROUTE HYDROGRAPH TO          31
ROUTE HYDROGRAPH TO          32
RUNOFF HYDROGRAPH AT         32
COMBINE  2 HYDROGRAPHS AT    32
ROUTE HYDROGRAPH TO          28
COMBINE  2 HYDROGRAPHS AT    28
RUNOFF HYDROGRAPH AT         28
COMBINE  2 HYDROGRAPHS AT    28
ROUTE HYDROGRAPH TO          33
END OF NETWORK
```

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##################################
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
##################################

RUN  DATE# 79/06/27.
     TIME# 13.35.35.
```

OSWEGO RIVER BASIN
HEC1DB
PMF- OVERFLOW ANALYSIS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
40	6	0	0	0	0	0	0	4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= .20 .40 .50 .60 .80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

1 BARGE CANAL LOCK 30 AT MACEDON (SUB AREA A1)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

3 GANARGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	147.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

```
         SPFE    PMS     R6      R12     R24     R48     R72     R96
         0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                    LOSS DATA
          LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
            0    0.00   0.00   1.00   0.00   0.00   1.00    .50    .05   0.00   0.00

                                  RECESSION DATA
                        STRTQ=  140.00   QRCSN=  550.00   RTIOR= 1.60

       0                              END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN  EXCS  LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN  EXCS  LOSS    COMP Q

                                                                        SUM  14.86  11.56   3.30  186787.
                                                                           ( 377.)( 294.)(  84.)( 5289.22)


          **********      **********      **********      **********      **********

                                  COMBINE HYDROGRAPHS

                  4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29

                          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                            2      2      0      0      0      0      1      0      0


          **********      **********      **********      **********      **********

                                  HYDROGRAPH ROUTING

                  5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS

                          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                            6      1      0      0      0      0      1      0      0
                                           ROUTING DATA
                  QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                   0.0   0.000   0.00     0      1      0      0             0

                          NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                            0      8      3  0.000  0.000  0.000     0.      0


          **********      **********      **********      **********      **********

                                 SUB-AREA RUNOFF COMPUTATION

                  6 LOWER CANARACUAL LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)

                          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                            6      0      0      0      0      0      1      0      0

                                          HYDROGRAPH DATA
             IHYDG   IUHG   TAREA    SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
               1      -1   110.00    0.00 5100.00   0.00  0.000     0      1      0

                                           PRECIP DATA
                      SPFE    PMS     R6     R12     R24     R48     R72     R96
                      0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                            LOSS DATA
```

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 120.00 QRCSN= 470.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.56	3.30	147318.
										(377.)	(294.)	(84.)	(4171.58)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

7 COMBINED AND LOCAL FLOWS AT LOCK 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	51.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 200.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.56	3.30	65053.
										(377.)	(294.)	(84.)	(1842.10)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

9 ROUTED FLOW E-3 TO LYONS (NODE 6)

```
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        6       1       0       0       0       0       1       0       0
                                       ROUTING DATA
           QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
             0.0   0.000    0.00       0       1       0       0               0

                   NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                       0       5       2   0.000   0.000   0.000      0.       0



     *********       *********       *********       *********       *********

                                COMBINE HYDROGRAPHS

            10 COMBINE FLOWS AT NODE 6

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        6       2       0       0       0       0       1       0       0



     *********       *********       *********       *********       *********

                              SUB-AREA RUNOFF COMPUTATION

            11 CANANDAICUA LAKE INFLOW

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        4       0       0       0       0       0       1       0       0

                                     HYDROGRAPH DATA
        IHYDC    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
            1      -1  184.00    0.00 5100.00    0.00   0.000       0       1       0

                                       PRECIP DATA
                 SPFE     PMS      R6     R12     R24     R48     R72     R96
                 0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                        LOSS DATA
       LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
           0    0.00    0.00    1.00    0.00    0.00    1.00    1.25     .03    0.00    0.00

                                      RECESSION DATA
                       STRTQ=  300.00     QRCSN= 1000.00     RTIOR= 1.60

        0                            END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                       SUM  14.86  12.00   2.86  252691.
                                                                          ( 377.)( 305.)(  73.)( 7155.41)



     *********       *********       *********       *********       *********

                                   HYDROGRAPH ROUTING

            12 CANANDAICUA LAKE OUT FLOW USING MODIFIED PULS METHOD

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        4       1       0       0       0       0       1       0       0
                                       ROUTING DATA
```

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	51000.	0

STORAGE	10700.00	21300.00	31900.00	42500.00	53100.00	63700.00	74300.00	84900.00	95500.00	106100.00
	212500.00	319000.00								
OUTFLOW	50.00	50.00	50.00	50.00	280.00	600.00	1000.00	1560.00	2250.00	3000.00
	63000.00	200366.00								

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

13 ROUTED OUTFLOW TO FLINT CREEK MOUTH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	0	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	12	5	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

14 FLINT CREEK INFLOW A-2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	102.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 90.00 QRCSN= 2000.000 RTIOR= 1.60

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	133487.
										(377.)	(281.)	(96.)	(3779.93)

********** ********** ********** ********** **********

```
                              COMBINE HYDROGRAPHS

            15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      5       2       0       0       0       0       1       0       0


      **********    **********    **********    **********    **********

                              HYDROGRAPH ROUTING

            16 OUTLET ROUTED TO LOCK 27

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     56       1       0       0       0       0       1       0       0
                                          ROUTING DATA
            QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
              0.0   0.000    0.00       0       1       0       0               0

                  NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                      0       7       3   0.000   0.000   0.000      0.       0


      **********    **********    **********    **********    **********

                           SUB-AREA RUNOFF COMPUTATION

            17 OUTLET LOCAL FLOW A-3

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     56       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
         IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
             1      -1  155.00    0.00 5100.00    0.00   0.000       0       1       0

                                          PRECIP DATA
                SPFE     PMS      R6     R12     R24     R48     R72     R96
                0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                          LOSS DATA
       LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
           0    0.00    0.00    1.00    0.00    0.00    1.00     .60     .06    0.00    0.00

                                        RECESSION DATA
                        STRTQ=  150.00    QRCSN=  200.00    RTIOR= 1.60

   0                                   END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                     SUM  14.86  11.06   3.80   187176.
                                                                        ( 377.)( 281.)(  97.)( 5300.23)


      **********    **********    **********    **********    **********

                              COMBINE HYDROGRAPHS

            18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27
```

```
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             56       2       0       0       0       0       1       0       0


**********        **********        **********        **********        **********

                                 HYDROGRAPH ROUTING

19 ROUTE OUTLET TO CANAL

          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
              6       1       0       0       0       0       1       0       0
                                   ROUTING DATA
    QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
      0.0   0.000    0.00       0       1       0       0               0

          NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
              0       1       0   0.000   0.000   0.000      0.       0


**********        **********        **********        **********        **********

                                 COMBINE HYDROGRAPHS

20 COMBINE FLOW AT 6(OUTLET FLOW + E-1, E-2, E-3)

          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
              6       2       0       0       0       0       1       0       0


**********        **********        **********        **********        **********

                                 HYDROGRAPH ROUTING

21 ROUTE FLOWS AT LOCK 27 TO NODE 8

          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
              8       1       0       0       0       0       1       0       0
                                   ROUTING DATA
    QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
      0.0   0.000    0.00       0       1       0       0               0

          NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
              0       8       3   0.000   0.000   0.000      0.       0


**********        **********        **********        **********        **********

                              SUB-AREA RUNOFF COMPUTATION

22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)

          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
              7       0       0       0       0       0       1       0       0

                                 HYDROGRAPH DATA
  IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
      1      -1   89.00    0.00 5100.00    0.00   0.000       0       1       0

                                   PRECIP DATA
          SPFE     PMS      R6     R12     R24     R48     R72     R96
          0.00   21.50   22.00   47.00   55.00   65.00   72.00   74.00
```

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 360.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	109181.
										(377.)	(281.)	(96.)	(3091.66)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

23 ROUTE FLOWS AT LOCK 26 TO NODE 8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

25 ROUTE FLOWS AT NODE 8 TO NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	5	2	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
9	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	18.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 90.00 QRCSN= 90.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	23275.
										(377.)	(281.)	(96.)	(659.07)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

27 ROUTE INFLOW E-5 TO NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

29 ROUTE FLOWS AT NODE 10 TO NODE 15

ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO

```
              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 15      1      0      0      0      0      1      0      0
                                ROUTING DATA
        QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
          0.0  0.000   0.00      0      1      0      0             0

              NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                  0      5      2  0.000  0.000  0.000     0.      0


  **********      **********      **********      **********      **********

                          SUB-AREA RUNOFF COMPUTATION

        30 LOCAL INFLOW B-1 INTO KEUKA LAKE

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 11      0      0      0      0      0      1      0      0

                               HYDROGRAPH DATA
      IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
          1     -1 183.00   0.00 5100.00  0.00  0.000      0      1      0

                                PRECIP DATA
            SPFE    PMS     R6    R12    R24    R48    R72    R96
            0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                 LOSS DATA
   LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
       0   0.00   0.00   1.00   0.00   0.00   1.00   1.50    .03   0.00   0.00

                               RECESSION DATA
                   STRTQ=  100.00   QRCSN=  800.00   RTIOR= 1.60

      0                          END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q     MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q


                                                         SUM  14.86  11.79   3.07   242812.
                                                            ( 377.)( 299.)(  78.)( 6875.67)



  **********      **********      **********      **********      **********

                            HYDROGRAPH ROUTING

        31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 11      1      0      0      0      0      1      0      0
                                ROUTING DATA
        QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
          0.0  0.000   0.00      1      1      0      0             0

              NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                  0      0      0  0.000  0.000  0.000 147000.      0

STORAGE   107000.00  129500.00  141000.00  153500.00  172000.00  178000.00  191000.00  204000.00  217000.00       0.00
          328550.00

OUTFLOW      120.00     320.00     445.00     530.00     575.00     670.00     890.00    1130.00    1470.00       0.00
          126000.00
```

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HYDROGRAPH ROUTING

32 ROUTE KEUKA LAKE OUTFLOWS TO 12

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	0	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

33 SENECA LAKE INFLOWS B-2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	524.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.03	0.00	0.00

RECESSION DATA

STRTQ= 500.00 QRCSN= 2800.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	12.52	2.34	741890.
										(377.)	(318.)	(59.)	(21007.99)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

34 COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

SUM 14.86 11.56 3.30 51530.
(377.)(294.)(84.)(1459.17)

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

38 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
13	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

40 LOCAL INFLOW B-5

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	36.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 92.00 QRCSN= 200.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

SUM 14.86 11.56 3.30 47972.
(377.)(294.)(84.)(1358.42)

```
                                  HYDROGRAPH ROUTING

               35 SENECA LAKE OUTFLOWS - MODIFIED  PULS METHOD

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            12       1       0       0       0       0       1       0       0
                                           ROUTING DATA
                   QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                     0.0   0.000    0.00       1       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       0       0   0.000   0.000   0.000 534000.       0

STORAGE    372000.00   414000.00   456000.00   500000.00   543000.00   586000.00   630000.00   650000.00   674000.00   720000.00
           800000.00  1200000.00

OUTFLOW       700.00      700.00      700.00      700.00      700.00      700.00      700.00     1000.00     3000.00     3000.00
            15000.00    77000.00


          **********       **********       **********       **********       **********

                                  HYDROGRAPH ROUTING

               36 SENECA LAKE OUTFLOWS ROUTED TO 13

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            13       1       0       0       0       0       1       0       0
                                           ROUTING DATA
                   QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                     0.0   0.000    0.00       0       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       2       0   0.000   0.000   0.000      0.       0


          **********       **********       **********       **********       **********

                               SUB-AREA RUNOFF COMPUTATION

               37 LOCAL INFLOW B-4

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            13       0       0       0       0       0       1       0       0

                                         HYDROGRAPH DATA
               IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                   1      -1   39.00    0.00 5100.00    0.00   0.000       0       1       0

                                           PRECIP DATA
                         SPFE     PMS      R6     R12     R24     R48     R72     R96
                         0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                            LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .05    0.00    0.00

                                          RECESSION DATA
                              STRTQ=   92.00   QRCSN=  200.00   RTIOR= 1.60

        0                                END-OF-PERIOD FLOW
      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
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COMBINE HYDROGRAPHS

41 COMBINE FLOW B-5 WITH ROUTED FLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

42 CAYUGA LAKE INFLOW B-3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	782.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.03	0.00	0.00

RECESSION DATA

STRTQ= 1000.00 QRCSN= 1700.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 12.52 2.34 1081195.
(377.)(318.)(59.)(30616.03)

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COMBINE HYDROGRAPHS

43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

44 CAYUGA LAKE OUTFLOW - MODIFIED PULS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0

```
              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 16      0      0      0      0      0      1      0      0

                               HYDROGRAPH DATA
      IHYDG   IUHG   TAREA   SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
          1     -1  191.00   0.00 5100.00    0.00   0.000       0       1       0

                               PRECIP DATA
              SPFE     PMS      R6     R12     R24     R48     R72     R96
              0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                               LOSS DATA
   LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
       0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                               RECESSION DATA
              STRTQ=  140.00    QRCSN=  400.00    RTIOR= 1.60

     0                        END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q    MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                   SUM  14.86  11.08   3.78  227590.
                                                        ( 377.)( 281.)(  96.)( 6444.63)


   **********     **********     **********     **********     **********

                               HYDROGRAPH ROUTING

        49 ROUTE LOCAL FLOW E-6 TO NODE 18

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 18      1      0      0      0      0      1      0      0
                               ROUTING DATA
        QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
          0.0  0.000   0.00      0      1      0      0             0

              NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                  0      2      0  0.000  0.000  0.000     0.      0


   **********     **********     **********     **********     **********

                               COMBINE HYDROGRAPHS

        50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 18      2      0      0      0      0      1      0      0


   **********     **********     **********     **********     **********

                               SUB-AREA RUNOFF COMPUTATION

        51 HEAD OWASCO INFLOW C-1

              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                 17      0      0      0      0      0      1      0      0

                               HYDROGRAPH DATA
```

```
         IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
            1     -1  201.00   0.00 5100.00  0.00  0.000      0      1      0

                                  PRECIP DATA
                SPFE    PMS     R6     R12    R24    R48    R72    R96
                0.00  21.50  33.00   47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                   LOSS DATA
        LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
            0   0.00   0.00   1.00   0.00   0.00   1.00    .75    .05   0.00   0.00

                                 RECESSION DATA
                    STRTQ=  450.00    QRCSN= 1000.00    RTIOR= 1.60

     0                            END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                    SUM  14.86  11.46   3.39   264813.
                                                                       ( 377.)( 291.)(  86.)( 7498.67)


          **********       **********       **********       **********       **********

                                  HYDROGRAPH ROUTING

                  52 OWASCO LAKE INFLOWS - MODIFIED PULS METHOD

                        ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                           17      1      0      0      0      0      1      0      0
                                      ROUTING DATA
                  QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP           LSTR
                    0.0  0.000   0.00      1      1      0      0              0

                        NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                            0      0      0  0.000  0.000  0.000  92000.      0

STORAGE     66000.00   73200.00   79900.00   86500.00   93200.00   99800.00  106500.00  113200.00  119800.00  126500.00
           152900.00  205700.00

OUTFLOW       600.00     600.00     600.00    1100.00    1700.00    2300.00    2860.00    3400.00    3400.00    3400.00
            24000.00   69100.00


          **********       **********       **********       **********       **********

                                  HYDROGRAPH ROUTING

                  53 ROUTE OWASCO LAKE OUTLET FLOWS

                        ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                           18      1      0      0      0      0      1      0      0
                                      ROUTING DATA
                  QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP           LSTR
                    0.0  0.000   0.00      0      1      0      0              0

                        NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                            0      7      3  0.000  0.000  0.000     0.      0


          **********       **********       **********       **********       **********

                                  COMBINE HYDROGRAPHS
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                                   COMBINE HYDROGRAPHS

              54 COMBINE FLOWS WITH FLOWS AT NODE 18

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          18       2       0       0       0       0       1       0       0


         **********     **********     **********     **********     **********

                                   SUB-AREA RUNOFF COMPUTATION

              55 READ LOCAL FLOW C-6

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          18       0       0       0       0       0       1       0       0

                                          HYDROGRAPH DATA
                 IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                     1      -1   19.00    0.00 5100.00    0.00   0.000       0       1       0

                                            PRECIP DATA
                          SPFE     PMS      R6     R12     R24     R48     R72     R96
                          0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                              LOSS DATA
               LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                   0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .06    0.00    0.00

                                            RECESSION DATA
                          STRTQ=   90.00   QRCSN=  200.00    RTIOR= 1.60

            0                                END-OF-PERIOD FLOW
       MO.DA  HR.MN  PERIOD    RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD    RAIN   EXCS   LOSS     COMP Q

                                                                                 SUM  14.86  11.08   3.78   25008.
                                                                                    ( 377.)( 281.)(  96.)(  710.41)


         **********     **********     **********     **********     **********

                                        COMBINE HYDROGRAPHS

              56 COMBINE  LOCAL FLOW C-6 WITH FLOW AT NODE 18

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          18       2       0       0       0       0       1       0       0


         **********     **********     **********     **********     **********

                                        HYDROGRAPH ROUTING

              57 ROUTE FLOW AT 18 TO NODE 21

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          21       1       0       0       0       0       1       0       0
                                          ROUTING DATA
                 QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                   0.0   0.000    0.00       0       1       0       0               0
```

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

58 LOCAL INFLOW E-7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
19	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	98.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 120.00 QRCSN= 400.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	122486.
										(377.)	(281.)	(96.)	(3468.42)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

59 ROUTE LOCAL FLOW TO NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

60 COMBINE ROUTED FLOW WITH FLOW AT 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

61 SKANEATELES LAKE INFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	74.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.75	.05	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 500.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.46 3.39 100549.
(377.)(291.)(86.)(2847.23)

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HYDROGRAPH ROUTING

62 SKANEATELES LAKE OUTFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	0.	0

STORAGE	0.00	17323.00	34756.00	52184.00	104368.00	208736.00	243492.00
OUTFLOW	0.00	353.00	747.00	1500.00	6403.00	13313.00	17359.00

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

63 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS CLOSS AVG IRES ISAME IOPT IPMP LSTR

```
                 0.0  0.000  0.00    0      1      0     0        0

                 NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                     0      6      2  0.000  0.000  0.000     0.      0


 **********     **********     **********     **********     **********

                                  COMBINE HYDROGRAPHS

             64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21

                 ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    21       2       0       0       0       0       1       0       0


 **********     **********     **********     **********     **********

                              SUB-AREA RUNOFF COMPUTATION

             65 LOCAL FLOW C-7

                 ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    21       0       0       0       0       0       1       0       0

                                    HYDROGRAPH DATA
           IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO  ISNOW   ISAME   LOCAL
               1      -1   27.00    0.00 5100.00    0.00   0.000      0       1       0

                                     PRECIP DATA
                SPFE     PMS      R6     R12     R24     R48     R72     R96
                0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                      LOSS DATA
       LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
           0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                                    RECESSION DATA
                    STRTQ=    90.00   QRCSN=  200.00    RTIOR= 1.60

     0                              END-OF-PERIOD FLOW
   MO.DA HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q     MO.DA HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                         SUM  14.86  11.08   3.78   35566.
                                                                            ( 377.)( 281.)(  96.)( 1007.12)



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                                  COMBINE HYDROGRAPHS

             66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21

                 ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    21       2       0       0       0       0       1       0       0


 **********     **********     **********     **********     **********

                                  HYDROGRAPH ROUTING
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67 ROUTING TO NODE 22

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	4	1	0.000	0.000	0.000	0.	0

**********   **********   **********   **********   **********

SUB-AREA RUNOFF COMPUTATION

68 LOCAL FLOW E-8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	98.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 120.00 QRCSN= 400.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	122095.
										(377.)	(281.)	(96.)	(3457.35)

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COMBINE HYDROGRAPHS

69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	2	0	0	0	0	1	0	0

**********   **********   **********   **********   **********

HYDROGRAPH ROUTING

70 BALDWINSVILLE POOL - MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	3250.	0

STORAGE	3250.00	5000.00	8400.00	10000.00	11700.00	14000.00	17000.00	20000.00	24000.00	30000.00
OUTFLOW	3000.00	4000.00	6000.00	8000.00	10000.00	12000.00	14000.00	15300.00	16600.00	17000.00

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HYDROGRAPH ROUTING

71 ROUTE FLOW TO NODE 26

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
26	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	4	1	0.000	0.000	0.000	0.	0

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SUB-AREA RUNOFF COMPUTATION

72 INFLOW TO OTISCO LAKE C-3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
23	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	42.70	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.75	.05	0.00	0.00

RECESSION DATA

STRTQ= 90.00 QRCSN= 300.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.46	3.39	57820.
										(377.)	(291.)	(86.)	(1637.51)

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                                   HYDROGRAPH ROUTING

                 73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            23       1       0       0       0       0       1       0       0
                                           ROUTING DATA
                   QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP             LSTR
                     0.0   0.000    0.00       1       1       0       0                0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0       0       0   0.000   0.000   0.000  29300.       0

STORAGE     19600.00    21800.00    23900.00    26100.00    28300.00    30500.00    32600.00    34800.00    37000.00    39200.00
            45700.00    52300.00    58800.00    65300.00

OUTFLOW       200.00      200.00      200.00      200.00      200.00      400.00      900.00     1600.00     2000.00     2000.00
             7040.00    18100.00    33700.00    53200.00


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                                   HYDROGRAPH ROUTING

                 74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            25       1       0       0       0       0       1       0       0
                                           ROUTING DATA
                   QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP             LSTR
                     0.0   0.000    0.00       0       1       0       0                0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             0      10       4   0.000   0.000   0.000      0.       0


             **********       **********       **********       **********       **********

                                SUB-AREA RUNOFF COMPUTATION

                 75 INFLOW INTO ONONDAGA RESERVOIR   C-4

                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            24       0       0       0       0       0       1       0       0

                                          HYDROGRAPH DATA
             IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                 1      -1   68.00    0.00 5100.00    0.00   0.000       0       1       0

                                            PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                             LOSS DATA
           LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
               0    0.00    0.00    1.00    0.00    0.00    1.00    1.50     .06    0.00    0.00

                                          RECESSION DATA
                        STRTQ=  250.00   QRCSN=  300.00   RTIOR= 1.60

        0                                END-OF-PERIOD FLOW
     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
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SUM 14.86 10.60 4.26 83772.
(377.)(269.)(108.)(2372.16)

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HYDROGRAPH ROUTING

76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
24	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	0.	0

STORAGE	0.00	100.00	700.00	1980.00	3500.00	7940.00	18200.00	22200.00	27000.00	32500.00
	43400.00	52300.00	62200.00	72100.00						
OUTFLOW	80.00	430.00	660.00	880.00	1070.00	1420.00	1770.00	1840.00	2000.00	2000.00
	6200.00	15400.00	28400.00	44700.00						

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HYDROGRAPH ROUTING

77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

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COMBINE HYDROGRAPHS

78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

79 LOCAL INFLOW C-5

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	102.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 500.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 10.77 4.08 126945.
(377.)(274.)(104.)(3594.68)

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COMBINE HYDROGRAPHS

80 COMBINE ROUTED FLOWS, LOCAL INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

81 LOCAL FLOW C-8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	72.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.06	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 300.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 10.94 3.92 91383.
(377.)(278.)(100.)(2587.68)

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COMBINE HYDROGRAPHS

82 COMBINE LOCAL FLOW AT NODE 25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

83 ROUTE FLOWS TO NODE 26

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
26	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

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COMBINE HYDROGRAPHS

84 COMBINE ROUTED FLOW AND FLOW AT NODE 26

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
26	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

85 ROUTE FLOWS TO NODE 28 (THREE RIVERS)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

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SUB-AREA RUNOFF COMPUTATION

86 LOCAL FLOW (E-9) AT NODE 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
27	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	37.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 150.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 46874.
(377.)(281.)(96.)(1327.32)

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HYDROGRAPH ROUTING

87 ROUTE LOCAL FLOW E-9 TO NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	1	0	0	0	1	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

STATION 28, PLAN 1, RTIO 1

OUTFLOW

19.	19.	18.	17.	17.	37.	168.	235.	280.	528.
1549.	2110.	1986.	996.	473.	259.	173.	74.	37.	28.
27.	26.	25.	24.	22.	21.	20.	20.	19.	18.
17.	16.	15.	15.	14.	13.	13.	12.	12.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2110.	2048.	1602.	734.	9368.
CMS	60.	58.	45.	21.	265.
INCHES		.51	1.61	2.22	2.36
MM		13.08	40.91	56.28	59.82
AC-FT		1015.	3177.	4370.	4645.
THOUS CU M		1253.	3919.	5390.	5730.

STATION 28, PLAN 1, RTIO 2

OUTFLOW

38.	38.	36.	35.	33.	75.	337.	470.	559.	1056.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
54.	52.	49.	47.	45.	43.	41.	39.	37.	36.
34.	32.	31.	29.	28.	27.	26.	24.	23.	23.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4221.	4096.	3203.	1469.	18736.
CMS	120.	116.	91.	42.	531.
INCHES		1.03	3.22	4.43	4.71
MM		26.16	81.83	112.55	119.65
AC-FT		2031.	6354.	8740.	9291.
THOUS CU M		2505.	7837.	10780.	11460.

STATION 28, PLAN 1, RTIO 3

OUTFLOW

48.	47.	46.	43.	41.	93.	421.	588.	699.	1320.
3872.	5276.	4964.	2491.	1182.	647.	432.	185.	92.	71.
68.	65.	62.	59.	56.	54.	51.	49.	47.	44.
42.	40.	39.	37.	35.	33.	32.	30.	29.	28.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5276.	5120.	4004.	1836.	23420.
CMS	149.	145.	113.	52.	663.
INCHES		1.29	4.03	5.54	5.89
MM		32.69	102.28	140.69	149.56
AC-FT		2539.	7942.	10925.	11613.
THOUS CU M		3131.	9797.	13475.	14325.

STATION 28, PLAN 1, RTIO 4

OUTFLOW

57.	56.	55.	52.	50.	112.	505.	705.	839.	1584.
4646.	6331.	5957.	2989.	1419.	777.	519.	222.	111.	85.
81.	78.	74.	71.	67.	64.	61.	59.	56.	53.
51.	48.	46.	44.	42.	40.	38.	37.	35.	34.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6331.	6144.	4805.	2203.	28105.
CMS	179.	174.	136.	62.	796.
INCHES		1.54	4.83	6.65	7.07
MM		39.23	122.74	168.83	179.47
AC-FT		3046.	9531.	13109.	13936.
THOUS CU M		3758.	11756.	16170.	17190.

STATION 28, PLAN 1, RTIO 5

OUTFLOW

76.	75.	73.	70.	66.	149.	674.	940.	1118.	2112.
6195.	8441.	7942.	3986.	1891.	1036.	692.	296.	148.	114.
108.	103.	99.	94.	90.	86.	82.	78.	74.	71.
68.	65.	62.	59.	56.	54.	51.	49.	47.	45.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8441.	8192.	6407.	2937.	37473.
CMS	239.	232.	181.	83.	1061.
INCHES		2.06	6.44	8.86	9.42
MM		52.31	163.65	225.10	239.30
AC-FT		4062.	12708.	17479.	18582.
THOUS CU M		5010.	15675.	21560.	22920.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 1

8875.	8852.	8835.	8814.	8772.	8751.	8953.	9171.	9387.	10184.
12925.	15932.	18110.	19116.	20399.	22072.	23698.	24853.	25760.	26136.
26110.	25017.	25341.	24713.	24079.	23540.	23137.	22847.	22676.	22618.
22649.	22741.	22856.	22966.	23041.	23064.	23024.	22909.	22782.	22656.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26136.	26123.	25903.	24637.	753394.
CMS	740.	740.	734.	698.	21334.
INCHES		.05	.19	.54	1.37
MM		1.20	4.77	13.61	34.70
AC-FT		12954.	51379.	146600.	373584.
THOUS CU M		15978.	63375.	180828.	460809.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 2

9194.	9172.	9183.	9204.	9200.	9256.	9778.	10326.	10873.	12582.
18236.	24255.	28504.	30267.	32346.	35068.	37554.	39189.	40382.	40638.
40357.	39735.	38908.	37933.	37068.	36447.	36090.	35900.	35864.	35971.
36207.	36550.	36973.	37448.	37939.	38410.	38828.	39161.	39402.	39559.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40638.	40510.	40210.	38315.	1155580.
CMS	1151.	1147.	1139.	1085.	32722.
INCHES		.07	.29	.83	2.10
MM		1.87	7.41	21.17	53.22
AC-FT		20088.	79755.	227993.	573015.
THOUS CU M		24778.	98376.	281225.	706803.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 3

9353.	9332.	9357.	9399.	9414.	9508.	10191.	10904.	11615.	13797.
20860.	28325.	33482.	35435.	37701.	40731.	43514.	45298.	46650.	46955.
46699.	46065.	45207.	44180.	43287.	42689.	42403.	42299.	42352.	42545.
42858.	43269.	43752.	44276.	44810.	45319.	45766.	46123.	46381.	46549.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46955.	46827.	46496.	44555.	1340699.
CMS	1330.	1326.	1317.	1262.	37964.
INCHES		.08	.34	.97	2.43
MM		2.16	8.57	24.62	61.74
AC-FT		23220.	92224.	265123.	664810.
THOUS CU M		28641.	113757.	327024.	820031.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 4

9513.	9492.	9531.	9595.	9628.	9761.	10604.	11483.	12358.	15018.
23482.	32353.	38377.	40457.	42871.	46182.	49268.	51253.	52815.	53242.
53063.	52458.	51593.	50531.	49630.	49076.	48880.	48877.	49031.	49317.
49711.	50189.	50725.	51293.	51859.	52391.	52852.	53211.	53466.	53627.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53627.	53547.	53135.	51275.	1527493.
CMS	1519.	1516.	1505.	1452.	43254.
INCHES		.10	.39	1.12	2.77
MM		2.47	9.79	28.34	70.34
AC-FT		26552.	105391.	305106.	757435.
THOUS CU M		32751.	129998.	376342.	934282.

```
                    SUM OF 2 HYDROGRAPHS AT      28  PLAN 1  RTIO 5
  9831.     9813.     9079.     9985.    10058.    10267.    11430.    12640.    13863.    17443.
 28600.    40290.    47974.    50270.    52909.    56966.    60770.    63310.    65480.    66295.
 66360.    65840.    64971.    63808.    62825.    62263.    62134.    62211.    62450.    62820.
 63301.    63868.    64490.    65164.    65834.    66468.    67021.    67451.    67758.    67951.

                      PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
             CFS    67951.    67854.    67360.    65143.       1904358.
             CMS     1924.     1921.     1907.     1845.         53925.
          INCHES                 .12       .49      1.42           3.45
              MM                3.12     12.41     36.00          87.70
           AC-FT              33647.   133606.   387626.        944310.
      THOUS CU M              41503.   164801.   478129.       1164789.


                    SUM OF 2 HYDROGRAPHS AT      28  PLAN 1  RTIO 6
 10150.    10133.    10228.    10376.    10487.    10774.    12257.    13819.    15410.    19894.
 33060.    48171.    57454.    59943.    62941.    67609.    72185.    75346.    78178.    79405.
 79709.    79278.    78374.    77086.    75992.    75392.    75293.    75420.    75715.    76152.
 76710.    77368.    78102.    78885.    79683.    80444.    81114.    81640.    82016.    82255.

                      PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
             CFS    82255.    82136.    81530.    78889.       2279043.
             CMS     2329.     2326.     2309.     2234.         64535.
          INCHES                 .15       .59      1.72           4.13
              MM                3.78     15.02     43.60         104.95
           AC-FT              40728.   161712.   469421.       1130104.
      THOUS CU M              50238.   199469.   579023.       1393963.


**********          **********          **********          **********          **********

                                   HYDROGRAPH ROUTING

           110 ROUTE FLOW AT 28 TO NODE 33

                       ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          33       1       0       0       0       1       1       0       0
                                            ROUTING DATA
                 QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                   0.0   0.000    0.00       0       1       0       0               0

                       NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                           0       3       1   0.000   0.000   0.000      0.       0

                               STATION      33, PLAN 1, RTIO 1

                                          OUTFLOW
  8875.     8868.     8854.     8834.     8807.     8779.     8825.     8958.     9171.     9581.
 10032.    13014.    15656.    17719.    19208.    20529.    22056.    23541.    24770.    25583.
 26002.    26021.    25756.    25291.    24711.    24111.    23585.    23175.    22887.    22713.
 22640.    22669.    22749.    22854.    22954.    23024.    23043.    22999.    22905.    22824.

                      PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
             CFS    26021.    26012.    25804.    24585.        739529.
             CMS      737.      737.      731.      696.         20941.
          INCHES                 .05       .19       .53           1.34
```

STATION 28, PLAN 1, RTIO 6

OUTFLOW

95.	94.	91.	87.	83.	187.	842.	1175.	1398.	2640.
7744.	10551.	9928.	4982.	2364.	1295.	864.	370.	184.	142.
136.	129.	123.	118.	112.	107.	102.	98.	93.	89.
85.	81.	77.	74.	70.	67.	64.	61.	58.	56.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10551.	10240.	8009.	3672.	46841.
CMS	299.	290.	227.	104.	1326.
INCHES		2.57	8.05	11.08	11.78
MM		65.39	204.57	281.38	299.12
AC-FT		5077.	15885.	21849.	23227.
THOUS CU M		6263.	19594.	26950.	28650.

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COMBINE HYDROGRAPHS

88 COMBINE HYDROGRAPHS AT 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN (C-2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
29	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

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HYDROGRAPH ROUTING

90 ROUTE FLOW AT NODE 29 TO NODE 30

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

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SUB-AREA RUNOFF COMPUTATION

91 LOCAL INFLOW D-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	529.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 800.00 QRCSN= 3960.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	681577.
										(377.)	(281.)	(96.)	(19300.11)

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COMBINE HYDROGRAPHS

92 COMBINE LOCAL FLOW WITH ROUTED FLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

93 ROUTE FLOWS TO NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	1	0	0.000	0.000	0.000	0.	0

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SUB-AREA RUNOFF COMPUTATION

94 LOCAL FLOW D-3

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                         ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                            31      0      0      0      0      0      1      0      0

                                          HYDROGRAPH DATA
               INTDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                   1      -1  144.00    0.00 5100.00    0.00   0.000       0       1       0

                                            PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                             LOSS DATA
           LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
               0   0.00   0.00   1.00   0.00   0.00   1.00    .25    .06   0.00   0.00

                                          RECESSION DATA
                              STRTQ=  320.00   QRCSN= 1000.00   RTIOR= 2.00

     0                                   END-OF-PERIOD FLOW
 MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                 SUM  14.86  11.08   3.78  176726.
                                                                    ( 377.)( 281.)(  96.)( 5004.32)



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                                        COMBINE HYDROGRAPHS

                 95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31

                         ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                            31      2      0      0      0      0      1      0      0


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                                      SUB-AREA RUNOFF COMPUTATION

                 96 LOCAL FLOW D-2

                         ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                            31      0      0      0      0      0      1      0      0

                                          HYDROGRAPH DATA
               INTDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                   1      -1  105.00    0.00 5100.00    0.00   0.000       0       1       0

                                            PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                             LOSS DATA
           LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
               0   0.00   0.00   1.00   0.00   0.00   1.00    .25    .06   0.00   0.00

                                          RECESSION DATA
                              STRTQ=  240.00   QRCSN=  800.00   RTIOR= 1.60

     0                                   END-OF-PERIOD FLOW
 MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q
```

NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 136512.
(377.)(281.)(96.)(3865.59)

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COMBINE HYDROGRAPHS

97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

98 LOCAL FLOW D-1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	280.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.05	0.05	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 600.00 QRCSN= 2160.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 361788.
(377.)(281.)(96.)(10244.70)

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COMBINE HYDROGRAPHS

99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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SUB-AREA RUNOFF COMPUTATION

100 LOCAL FLOW B-5

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	269.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.05	0.00	0.00

RECESSION DATA

STRTQ= 540.00 QRCSN= 2000.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.56	3.30	363523.
										(377.)	(294.)	(84.)	(10293.83)

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COMBINE HYDROGRAPHS

101 COMBINE LOCAL B-5 WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	670000.	0

STORAGE	442000.00	635000.00	640000.00	650000.00	680000.00	735000.00	806000.00	845000.00	0.00	0.00
	990000.00	1150000.00	1304000.00							
OUTFLOW	1000.00	1000.00	2000.00	4000.00	6000.00	8000.00	10000.00	11000.00	0.00	0.00
	27900.00	64700.00	116600.00							

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                                             HYDROGRAPH ROUTING

                        103 ROUTE FLOWS TO NODE 32

                                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                   32       1       0       0       0       0       1       0       0
                                                     ROUTING DATA
                        QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                          0.0   0.000    0.00       0       1       0       0               0

                                NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                    0       1       0   0.000   0.000   0.000      0.       0


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                                          SUB-AREA RUNOFF COMPUTATION

                        104 LOCAL FLOW D-6

                                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                   32       0       0       0       0       0       1       0       0

                                                    HYDROGRAPH DATA
                    IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                        1      -1   20.00    0.00 5100.00    0.00   0.000       0       1       0

                                                      PRECIP DATA
                            SPFE     PMS      R6     R12     R24     R48     R72     R96
                            0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS   .934

                                                       LOSS DATA
                  LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                      0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .06    0.00    0.00

                                                     RECESSION DATA
                                 STRTQ=   70.00   QRCSN=  210.00   RTIOR= 1.60

              0                                   END-OF-PERIOD FLOW
       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                                  SUM  14.86  11.08   3.78   36884.
                                                                                     ( 377.)( 281.)(  96.)( 1044.44)


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                                              COMBINE HYDROGRAPHS

                        105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32

                                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                   32       2       0       0       0       0       1       0       0


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                                               HYDROGRAPH ROUTING

                        106 ROUTE FLOW AT 32 TO NODE 30
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                    106 ROUTE FLOW AT 32 TO NODE 28

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                              28       1       0       0       0       0       1       0       0
                                                    ROUTING DATA
                        QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                          0.0   0.000    0.00       0       1       0       0               0

                            NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                0       6       2   0.000   0.000   0.000     0.       0


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                                              COMBINE HYDROGRAPHS

                    107 COMBINE ROUTED FLOW WITH FLOW AT NODE 28

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                              28       2       0       0       0       0       1       0       0


             *********         *********         *********         *********         *********

                                              SUB-AREA RUNOFF COMPUTATION

                    108 LOCAL FLOW D-7

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                              28       0       0       0       0       0       1       0       0

                                                  HYDROGRAPH DATA
                  IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                      1      -1  110.00    0.00 5100.00    0.00   0.000       0       1       0

                                                    PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.50   33.00   47.00   55.00   65.00   72.00   77.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                     LOSS DATA
                 LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                     0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .06    0.00    0.00

                                                   RECESSION DATA
                            STRTQ=  250.00     QRCSN=  800.00     RTIOR= 2.00

            0                                      END-OF-PERIOD FLOW
       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  15.46  11.25   4.21   138583.
                                                                             ( 393.)( 286.)( 107.)( 3924.23)


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                                              COMBINE HYDROGRAPHS

                    109 COMBINE WITH FLOW AT NODE 28

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                              28       2       0       0       0       1       1       0       0
```

MM		1.20	4.75	13.59	34.00
AC-FT		12898.	51181.	146290.	366709.
THOUS CU M		15910.	63131.	180446.	452328.

STATION 33, PLAN 1, RTIO 2

OUTFLOW

9194.	9187.	9183.	9186.	9196.	9220.	9411.	9787.	10326.	11260.
13097.	18350.	23665.	27675.	30372.	32560.	34989.	37270.	39042.	40070.
40459.	40244.	39667.	38859.	37970.	37149.	36535.	36146.	35952.	35912.
36014.	36242.	36576.	36990.	37453.	37932.	38392.	38799.	39130.	39322.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40459.	40351.	40032.	38240.	1125333.
CMS	1146.	1143.	1134.	1083.	31866.
INCHES		.07	.29	.83	2.04
MM		1.86	7.37	21.13	51.82
AC-FT		20009.	79402.	227544.	558016.
THOUS CU M		24681.	97940.	280671.	688303.

STATION 33, PLAN 1, RTIO 3

OUTFLOW

9353.	9346.	9348.	9363.	9390.	9441.	9704.	10201.	10903.	12106.
15424.	20994.	27556.	32414.	35539.	37956.	40649.	43181.	45154.	46301.
46768.	46573.	45990.	45151.	44225.	43385.	42793.	42463.	42351.	42398.
42505.	42891.	43293.	43766.	44279.	44802.	45298.	45736.	46090.	46295.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46768.	46670.	46304.	44495.	1303631.
CMS	1324.	1322.	1311.	1260.	36915.
INCHES		.08	.34	.97	2.36
MM		2.15	8.53	24.59	60.03
AC-FT		23142.	91842.	264766.	646429.
THOUS CU M		28546.	113285.	326583.	797358.

STATION 33, PLAN 1, RTIO 4

OUTFLOW

9513.	9506.	9512.	9539.	9585.	9661.	9998.	10616.	11482.	12953.
16953.	23618.	31404.	37062.	40568.	43170.	46107.	48901.	51112.	52437.
53040.	52921.	52372.	51528.	50585.	49745.	49195.	48944.	48929.	49075.
49353.	49739.	50208.	50736.	51292.	51847.	52367.	52818.	53176.	53381.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53381.	53279.	52744.	50892.	1483502.
CMS	1512.	1509.	1494.	1441.	42008.
INCHES		.10	.38	1.11	2.69
MM		2.45	9.72	28.12	68.32
AC-FT		26419.	104616.	302829.	735621.
THOUS CU M		32588.	129042.	373533.	907375.

STATION 33, PLAN 1, RTIO 5

OUTFLOW

9831.	9825.	9841.	9892.	9974.	10103.	10585.	11446.	12644.	14648.
19995.	28007.	38984.	46183.	50413.	53411.	56908.	60349.	63186.	65028.
66045.	66168.	65726.	64876.	63868.	62965.	62407.	62203.	62265.	62494.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67656.	67533.	66892.	64674.	1846386.
CMS	1916.	1912.	1894.	1831.	52284.
INCHES		.12	.49	1.41	3.35
MM		3.11	12.32	35.74	85.03
AC-FT		33487.	132679.	384838.	915563.
THOUS CU M		41306.	163657.	474691.	1129331.

STATION 33, PLAN 1, RTIO 6

OUTFLOW

10150.	10144.	10170.	10246.	10364.	10546.	11173.	12283.	13829.	16374.
23055.	33975.	46495.	55189.	60113.	63498.	67570.	71713.	75236.	77643.
79097.	79464.	79120.	78246.	77151.	76156.	75559.	75368.	75476.	75762.
76192.	76743.	77393.	78118.	78890.	79671.	80414.	81066.	81590.	81891.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	81891.	81740.	80963.	78329.	2207121.
CMS	2319.	2315.	2293.	2218.	62499.
INCHES		.15	.59	1.70	4.00
MM		3.76	14.91	43.29	101.64
AC-FT		40532.	160587.	466088.	1094440.
THOUS CU M		49996.	198081.	574912.	1349972.

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1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

						RATIOS APPLIED TO FLOWS			
OPERATION	STATION	AREA	PLAN	RATIO 1 .20	RATIO 2 .40	RATIO 3 .50	RATIO 4 .60	RATIO 5 .80	RATIO 6 1.00
HYDROGRAPH AT	1	100.00	1	78.	157.	196.	235.	314.	392.
		(259.00)		(2.22)(	4.44)(	5.55)(	6.66)(	8.88)(	11.10)(
ROUTED TO	2	100.00	1	78.	156.	195.	234.	311.	389.
		(259.00)		(2.20)(	4.41)(	5.51)(	6.61)(	8.82)(	11.02)(
HYDROGRAPH AT	2	147.00	1	5716.	11432.	14291.	17149.	22865.	28581.
		(380.73)		(161.86)(	323.73)(	404.66)(	485.59)(	647.46)(	809.32)(
2 COMBINED	2	247.00	1	5793.	11585.	14481.	17378.	23170.	28963.
		(639.73)		(164.03)(	328.05)(	410.07)(	492.08)(	656.11)(	820.13)(
ROUTED TO	6	247.00	1	3651.	7301.	9127.	10952.	14602.	18253.
		(639.73)		(103.37)(	206.75)(	258.43)(	310.12)(	413.50)(	516.87)(
HYDROGRAPH AT	6	118.00	1	2735.	5469.	6837.	8204.	10939.	13674.
		(305.62)		(77.44)(	154.88)(	193.60)(	232.32)(	309.75)(	387.19)(
2 COMBINED	6	365.00	1	6222.	12444.	15555.	18666.	24880.	31110.
		(945.35)		(176.19)(	352.30)(	440.47)(	528.57)(	704.75)(	880.94)(

HYDROGRAPH AT	3	51.00	1	3559.	7119.	8898.	10678.	14237.	17797.
		(132.09)	(	100.79)(	201.58)(	251.97)(	302.37)(	403.16)(	503.95)(
ROUTED TO	6	51.00	1	1974.	3948.	4934.	5921.	7895.	9869.
		(132.09)	(	55.89)(	111.78)(	139.73)(	167.67)(	223.56)(	279.46)(
2 COMBINED	6	416.00	1	6557.	13115.	16393.	19672.	26229.	32787.
		(1077.44)	(	185.68)(	371.36)(	464.21)(	557.05)(	742.73)(	928.41)(
HYDROGRAPH AT	4	184.00	1	14208.	28416.	35520.	42624.	56832.	71040.
		(476.56)	(	402.32)(	804.65)(	1005.81)(	1206.97)(	1609.30)(	2011.62)(
ROUTED TO	4	184.00	1	868.	1985.	2666.	5119.	11584.	18145.
		(476.56)	(	24.58)(	56.20)(	75.48)(	144.96)(	328.03)(	513.80)(
ROUTED TO	5	184.00	1	828.	1833.	2447.	3475.	6907.	10624.
		(476.56)	(	23.45)(	51.89)(	69.29)(	98.40)(	195.59)(	300.84)(
HYDROGRAPH AT	5	102.00	1	2638.	5276.	6595.	7914.	10552.	13190.
		(264.18)	(	74.70)(	149.40)(	186.75)(	224.11)(	298.81)(	373.51)(
2 COMBINED	5	286.00	1	3060.	6020.	7544.	9246.	13808.	18651.
		(740.74)	(	86.66)(	170.47)(	213.63)(	261.82)(	390.99)(	528.15)(
ROUTED TO	56	286.00	1	2577.	5093.	6405.	7999.	12497.	17263.
		(740.74)	(	72.97)(	144.22)(	181.38)(	226.50)(	353.88)(	488.83)(
HYDROGRAPH AT	56	155.00	1	4849.	9698.	12123.	14548.	19397.	24246.
		(401.45)	(	137.32)(	274.63)(	343.29)(	411.95)(	549.26)(	686.58)(
2 COMBINED	56	441.00	1	7157.	14184.	17730.	21420.	29528.	37918.
		(1142.18)	(	202.66)(	401.65)(	502.07)(	606.56)(	836.13)(	1073.71)(
ROUTED TO	6	441.00	1	7157.	14184.	17730.	21420.	29528.	37918.
		(1142.18)	(	202.66)(	401.65)(	502.07)(	606.56)(	836.13)(	1073.71)(
2 COMBINED	6	857.00	1	13498.	26867.	33585.	40445.	54894.	69626.
		(2219.62)	(	382.23)(	760.80)(	951.01)(	1145.28)(	1554.43)(	1971.59)(
ROUTED TO	8	857.00	1	11700.	23294.	29131.	35158.	48028.	61131.
		(2219.62)	(	331.29)(	659.62)(	824.91)(	995.56)(	1360.00)(	1731.02)(
HYDROGRAPH AT	7	89.00	1	3132.	6264.	7830.	9396.	12528.	15660.
		(230.51)	(	88.69)(	177.38)(	221.72)(	266.07)(	354.76)(	443.44)(
ROUTED TO	8	89.00	1	2937.	5873.	7342.	8810.	11746.	14683.
		(230.51)	(	83.16)(	166.31)(	207.89)(	249.47)(	332.62)(	415.78)(
2 COMBINED	8	946.00	1	12296.	24459.	30571.	36838.	50268.	63931.
		(2450.13)	(	348.18)(	692.59)(	865.68)(	1043.14)(	1423.43)(	1810.31)(
ROUTED TO	10	946.00	1	11829.	23528.	29410.	35496.	48475.	61680.
		(2450.13)	(	334.95)(	666.25)(	832.79)(	1005.12)(	1372.67)(	1746.58)(
HYDROGRAPH AT	9	18.00	1	608.	1217.	1521.	1825.	2433.	3042.
		(46.62)	(	17.23)(	34.45)(	43.07)(	51.68)(	68.91)(	86.13)(
ROUTED TO	10	18.00	1	601.	1201.	1502.	1802.	2403.	3003.
		(46.62)	(	17.01)(	34.02)(	42.52)(	51.03)(	68.04)(	85.05)(
2 COMBINED	10	964.00	1	11922.	23714.	29642.	35718.	48772.	62051.
		(2496.75)	(	337.58)(	671.51)(	839.37)(	1011.43)(	1381.08)(	1757.09)(
ROUTED TO	15	964.00	1	11544.	22961.	28702.	34595.	47266.	60158.
		(2496.75)	(	326.88)(	650.18)(	812.76)(	979.61)(	1338.43)(	1703.49)(

HYDROGRAPH AT	11	183.00	1	20366.	40732.	50915.	61098.	81464.	101830.
		(473.97)	(	576.70)(	1153.40)(	1441.75)(	1730.10)(	2306.80)(	2883.49)(
ROUTED TO	11	183.00	1	560.	839.	1036.	1282.	1845.	2406.
		(473.97)	(	15.85)(	23.74)(	29.34)(	36.30)(	52.23)(	68.14)(
ROUTED TO	12	183.00	1	559.	831.	1026.	1263.	1817.	2371.
		(473.97)	(	15.83)(	23.52)(	29.05)(	35.70)(	51.46)(	67.13)(
HYDROGRAPH AT	12	524.00	1	41859.	83718.	104647.	125577.	167436.	209295.
		(1357.15)	(	1185.31)(	2370.62)(	2963.28)(	3555.94)(	4741.25)(	5926.56)(
2 COMBINED	12	707.00	1	42350.	84221.	105156.	126101.	167996.	209892.
		(1831.12)	(	1199.22)(	2384.80)(	2977.69)(	3570.79)(	4757.11)(	5943.48)(
ROUTED TO	12	707.00	1	700.	2514.	3000.	4713.	12318.	19824.
		(1831.12)	(	19.82)(	71.20)(	84.95)(	133.47)(	348.82)(	561.34)(
ROUTED TO	13	707.00	1	700.	2508.	3000.	4701.	12312.	19707.
		(1831.12)	(	19.82)(	71.01)(	84.95)(	133.12)(	348.65)(	558.05)(
HYDROGRAPH AT	13	39.00	1	1958.	3915.	4894.	5873.	7831.	9789.
		(101.01)	(	55.44)(	110.87)(	138.59)(	166.31)(	221.75)(	277.18)(
2 COMBINED	13	746.00	1	2658.	4615.	5657.	7109.	13847.	21998.
		(1932.13)	(	75.26)(	130.69)(	160.19)(	201.31)(	392.09)(	622.90)(
ROUTED TO	14	746.00	1	1917.	3419.	4912.	5982.	13164.	20914.
		(1932.13)	(	54.28)(	96.83)(	139.09)(	169.39)(	372.76)(	592.22)(
HYDROGRAPH AT	14	36.00	1	1927.	3854.	4817.	5780.	7707.	9634.
		(93.24)	(	54.56)(	109.12)(	136.40)(	163.68)(	218.24)(	272.80)(
2 COMBINED	14	782.00	1	3364.	6028.	7370.	8781.	13470.	21512.
		(2025.37)	(	95.26)(	170.69)(	208.71)(	248.66)(	381.42)(	609.16)(
HYDROGRAPH AT	14	782.00	1	43279.	86557.	108197.	129836.	173114.	216393.
		(2025.37)	(	1225.51)(	2451.03)(	3063.78)(	3676.54)(	4902.05)(	6127.57)(
2 COMBINED	14	1564.00	1	46193.	91686.	114432.	137179.	182681.	228285.
		(4050.74)	(	1308.04)(	2596.25)(	3240.36)(	3884.47)(	5172.96)(	6464.31)(
ROUTED TO	14	1564.00	1	3400.	8700.	8700.	8700.	8700.	8700.
		(4050.74)	(	96.28)(	246.36)(	246.36)(	246.36)(	246.36)(	246.36)(
ROUTED TO	15	1564.00	1	3400.	8700.	8700.	8700.	8700.	8700.
		(4050.74)	(	96.28)(	246.36)(	246.36)(	246.36)(	246.36)(	246.36)(
2 COMBINED	15	2528.00	1	14944.	31661.	37402.	43295.	55966.	68858.
		(6547.49)	(	423.15)(	896.54)(	1059.12)(	1225.97)(	1584.78)(	1949.84)(
ROUTED TO	18	2528.00	1	14139.	30071.	35426.	40960.	52754.	64739.
		(6547.49)	(	400.37)(	851.52)(	1003.14)(	1159.86)(	1493.83)(	1833.21)(
HYDROGRAPH AT	16	191.00	1	8770.	17539.	21924.	26309.	35079.	43849.
		(494.69)	(	248.33)(	496.66)(	620.83)(	744.99)(	993.32)(	1241.65)(
ROUTED TO	18	191.00	1	8307.	16613.	20766.	24920.	33226.	41533.
		(494.69)	(	235.22)(	470.43)(	588.04)(	705.65)(	940.86)(	1176.08)(
2 COMBINED	18	2719.00	1	14213.	30219.	35610.	41181.	53049.	65108.
		(7042.18)	(	402.46)(	855.70)(	1008.36)(	1166.12)(	1502.18)(	1843.65)(
HYDROGRAPH AT	17	201.00	1	11920.	23840.	29801.	35761.	47681.	59601.
		(520.59)	(	337.54)(	675.09)(	843.86)(	1012.63)(	1350.17)(	1687.71)(

ROUTED TO	17	201.00	1	2523.	3400.	6860.	10899.	19286.	27153.
		(520.59)	(	71.45)(	96.20)(	194.25)(	308.61)(	546.11)(	768.87)(
ROUTED TO	18	201.00	1	2440.	3400.	5197.	8317.	14130.	20256.
		(520.59)	(	69.09)(	96.20)(	147.16)(	235.52)(	400.12)(	573.58)(
2 COMBINED	18	2920.00	1	16048.	33461.	39010.	44581.	56449.	68523.
		(7562.77)	(	454.42)(	947.51)(	1104.64)(	1262.40)(	1598.46)(	1940.35)(
HYDROGRAPH AT	18	19.00	1	708.	1416.	1770.	2124.	2831.	3539.
		(49.21)	(	20.04)(	40.09)(	50.11)(	60.13)(	80.18)(	100.22)(
2 COMBINED	18	2939.00	1	16082.	33529.	39095.	44683.	56585.	68692.
		(7611.98)	(	455.38)(	949.43)(	1107.04)(	1265.28)(	1602.30)(	1945.15)(
ROUTED TO	21	2939.00	1	15651.	32572.	37923.	43327.	54904.	66706.
		(7611.98)	(	443.19)(	922.33)(	1073.86)(	1226.88)(	1554.71)(	1888.91)(
HYDROGRAPH AT	19	98.00	1	5333.	10666.	13333.	15999.	21333.	26666.
		(253.82)	(	151.02)(	302.04)(	377.55)(	453.06)(	604.07)(	755.09)(
ROUTED TO	21	98.00	1	3197.	6395.	7993.	9592.	12789.	15986.
		(253.82)	(	90.54)(	181.07)(	226.34)(	271.61)(	362.15)(	452.68)(
2 COMBINED	21	3037.00	1	15710.	32683.	38062.	43494.	55127.	66985.
		(7865.79)	(	444.84)(	925.49)(	1077.80)(	1231.62)(	1561.02)(	1896.79)(
HYDROGRAPH AT	20	74.00	1	9096.	18191.	22739.	27287.	36383.	45478.
		(191.66)	(	257.56)(	515.12)(	643.90)(	772.68)(	1030.24)(	1287.80)(
ROUTED TO	20	74.00	1	179.	358.	456.	555.	757.	1124.
		(191.66)	(	5.06)(	10.13)(	12.93)(	15.72)(	21.44)(	31.83)(
ROUTED TO	21	74.00	1	177.	354.	451.	549.	745.	1098.
		(191.66)	(	5.01)(	10.02)(	12.78)(	15.54)(	21.08)(	31.08)(
2 COMBINED	21	3111.00	1	15877.	33016.	38484.	44007.	55821.	67932.
		(8057.45)	(	449.59)(	934.92)(	1089.74)(	1246.13)(	1580.66)(	1923.62)(
HYDROGRAPH AT	21	27.00	1	1584.	3168.	3959.	4751.	6335.	7919.
		(69.93)	(	44.85)(	89.69)(	112.12)(	134.54)(	179.39)(	224.24)(
2 COMBINED	21	3138.00	1	15903.	33065.	38545.	44079.	55918.	68053.
		(8127.38)	(	450.31)(	936.29)(	1091.46)(	1248.19)(	1583.41)(	1927.06)(
ROUTED TO	22	3138.00	1	15786.	32815.	38247.	43745.	55465.	67485.
		(8127.38)	(	447.01)(	929.21)(	1083.04)(	1238.71)(	1570.59)(	1910.96)(
HYDROGRAPH AT	22	98.00	1	7764.	15527.	19409.	23291.	31055.	38819.
		(253.82)	(	219.84)(	439.69)(	549.61)(	659.53)(	879.38)(	1099.22)(
2 COMBINED	22	3236.00	1	15827.	32898.	38351.	43869.	55630.	67692.
		(8381.20)	(	448.18)(	931.55)(	1085.97)(	1242.23)(	1575.27)(	1916.82)(
ROUTED TO	22	3236.00	1	15035.	27531.	32506.	37545.	48117.	58777.
		(8381.20)	(	425.76)(	779.59)(	920.48)(	1063.17)(	1362.53)(	1664.38)(
ROUTED TO	26	3236.00	1	14971.	27442.	32406.	37409.	47930.	58540.
		(8381.20)	(	423.92)(	777.07)(	917.62)(	1059.30)(	1357.23)(	1657.66)(
HYDROGRAPH AT	23	42.70	1	4418.	8835.	11044.	13253.	17671.	22089.
		(110.59)	(	125.10)(	250.19)(	312.74)(	375.29)(	500.38)(	625.48)(
ROUTED TO	23	42.70	1	748.	1736.	2000.	2218.	4376.	6539.
		(110.59)	(	21.18)(	49.17)(	56.63)(	62.81)(	123.91)(	185.17)(

ROUTED TO	25	42.70	1	586.	1319.	1667.	1911.	2720.	3610.
		(110.59)	(	16.59)(	37.35)(	47.21)(	54.13)(	77.03)(	102.22)(
HYDROGRAPH AT	24	68.00	1	5101.	10202.	12753.	15304.	20405.	25506.
		(176.12)	(	144.45)(	288.90)(	361.13)(	433.35)(	577.80)(	722.25)(
ROUTED TO	24	68.00	1	1160.	1518.	1628.	1743.	1909.	2000.
		(176.12)	(	32.85)(	42.98)(	46.11)(	49.35)(	54.05)(	56.63)(
ROUTED TO	25	68.00	1	1085.	1481.	1594.	1707.	1874.	2000.
		(176.12)	(	30.72)(	41.95)(	45.13)(	48.33)(	53.05)(	56.63)(
2 COMBINED	25	110.70	1	1656.	2800.	3261.	3618.	4594.	5610.
		(286.71)	(	46.91)(	79.29)(	92.33)(	102.46)(	130.09)(	158.85)(
HYDROGRAPH AT	25	102.00	1	5570.	11141.	13926.	16711.	22282.	27852.
		(264.18)	(	157.74)(	315.48)(	394.34)(	473.21)(	630.95)(	788.69)(
2 COMBINED	25	212.70	1	6264.	12169.	15086.	17971.	23907.	29854.
		(550.89)	(	177.37)(	344.58)(	427.20)(	508.89)(	676.97)(	845.38)(
HYDROGRAPH AT	25	72.00	1	3355.	6709.	8386.	10064.	13418.	16773.
		(186.48)	(	94.99)(	189.98)(	237.48)(	284.97)(	379.97)(	474.96)(
2 COMBINED	25	284.70	1	9262.	18165.	22581.	26965.	35899.	44844.
		(737.37)	(	262.26)(	514.37)(	639.43)(	763.56)(	1016.54)(	1269.85)(
ROUTED TO	26	284.70	1	5545.	10654.	13138.	15563.	20730.	25914.
		(737.37)	(	157.03)(	301.69)(	372.02)(	440.69)(	587.02)(	733.81)(
2 COMBINED	26	3520.70	1	17460.	28827.	34158.	39533.	50532.	61524.
		(9118.57)	(	494.42)(	816.30)(	967.24)(	1119.46)(	1430.91)(	1742.17)(
ROUTED TO	28	3520.70	1	16731.	28565.	33868.	39258.	50202.	61123.
		(9118.57)	(	473.76)(	808.86)(	959.02)(	1111.67)(	1421.55)(	1730.82)(
HYDROGRAPH AT	27	37.00	1	3278.	6556.	8195.	9834.	13112.	16390.
		(95.83)	(	92.82)(	185.64)(	232.06)(	278.47)(	371.29)(	464.11)(
ROUTED TO	28	37.00	1	2110.	4221.	5276.	6331.	8441.	10551.
		(95.83)	(	59.76)(	119.51)(	149.39)(	179.27)(	239.03)(	298.78)(
2 COMBINED	28	3557.70	1	16758.	28587.	33896.	39292.	50247.	61180.
		(9214.40)	(	474.52)(	809.50)(	959.82)(	1112.62)(	1422.83)(	1732.42)(
HYDROGRAPH AT	29	100.00	1	0.	0.	0.	0.	0.	0.
		(259.00)	(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(
ROUTED TO	30	100.00	1	0.	0.	0.	0.	0.	0.
		(259.00)	(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(
HYDROGRAPH AT	30	529.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1370.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
2 COMBINED	30	629.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1629.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
ROUTED TO	31	629.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1629.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
HYDROGRAPH AT	31	144.00	1	4722.	9444.	11804.	14165.	18887.	23609.
		(372.96)	(	133.71)(	267.41)(	334.27)(	401.12)(	534.83)(	668.53)(
2 COMBINED	31	773.00	1	28027.	56054.	70067.	84081.	112108.	140135.
		(2002.06)	(	793.63)(	1587.27)(	1984.09)(	2380.90)(	3174.54)(	3968.17)(

```
HYDROGRAPH AT      31   105.00       1    5045.   10089.   12611.   15134.   20178.   25223.
                    (  271.95)        (  142.85)(  285.69)(  357.11)(  428.54)(  571.38)(  714.23)(

 2 COMBINED        31   870.00       1   32185.   64370.   80462.   96555.  128740.  160925.
                    ( 2274.01)        (  911.30)( 1822.75)( 2278.44)( 2734.13)( 3645.50)( 4556.88)(

HYDROGRAPH AT      31   288.00       1    8352.   16705.   20881.   25057.   33410.   41762.
                    (  745.92)        (  236.51)(  473.03)(  591.28)(  709.54)(  946.06)( 1182.57)(

 2 COMBINED        31  1166.00       1   36521.   73041.   91301.  109562.  146082.  182603.
                    ( 3019.93)        ( 1034.15)( 2068.29)( 2585.36)( 3102.44)( 4136.58)( 5170.73)(

HYDROGRAPH AT      31   269.00       1   19077.   38153.   47691.   57230.   76306.   95383.
                    (  696.71)        (  540.19)( 1080.38)( 1350.47)( 1620.57)( 2160.75)( 2700.94)(

 2 COMBINED        31  1435.00       1   42495.   84990.  106238.  127485.  169980.  212476.
                    ( 3716.63)        ( 1203.33)( 2406.65)( 3008.32)( 3609.98)( 4813.31)( 6016.64)(

ROUTED TO          31  1435.00       1    8666.   12305.   14086.   15877.   19464.   23053.
                    ( 3716.63)        (  245.38)(  348.44)(  398.87)(  449.59)(  551.15)(  652.79)(

ROUTED TO          32  1435.00       1    8666.   12305.   14086.   15877.   19464.   23053.
                    ( 3716.63)        (  245.38)(  348.44)(  398.87)(  449.59)(  551.15)(  652.79)(

HYDROGRAPH AT      32    28.00       1    1215.    2430.    3038.    3645.    4860.    6075.
                    (   72.52)        (   34.41)(   68.81)(   86.02)(  103.22)(  137.62)(  172.03)(

 2 COMBINED        32  1463.00       1    8804.   12502.   14309.   16118.   19761.   23409.
                    ( 3789.15)        (  249.30)(  354.01)(  405.18)(  456.41)(  559.58)(  662.86)(

ROUTED TO          28  1463.00       1    8756.   12431.   14229.   16032.   19659.   23289.
                    ( 3789.15)        (  247.95)(  352.02)(  402.92)(  453.98)(  556.69)(  659.47)(

 2 COMBINED        28  5020.70       1   25503.   39439.   46398.   53447.   67711.   81954.
                    (13003.55)        (  722.17)( 1116.79)( 1313.85)( 1513.45)( 1917.35)( 2320.69)(

HYDROGRAPH AT      28   110.00       1    3626.    7251.    9064.   10877.   14503.   18128.
                    (  284.90)        (  102.67)(  205.34)(  256.67)(  308.01)(  410.67)(  513.34)(

 2 COMBINED        28  5130.70       1   26136.   40638.   46955.   53627.   67951.   82255.
                    (13288.45)        (  740.08)( 1150.75)( 1329.62)( 1518.56)( 1924.16)( 2329.20)(

ROUTED TO          33  5130.70       1   26021.   40459.   46768.   53381.   67656.   81891.
                    (13288.45)        (  736.83)( 1145.67)( 1324.32)( 1511.58)( 1915.79)( 2318.89)(

1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
 **********************************
0
TERMINAL   325 TIME OUT.


:ON= 3:24 MRU=     7.366
```

Table I-1: Physical Characteristics of Lakes in the Basin

Name	Regulating Agency	Drainage Area (sq.mi.)	Surface Area (sq.mi.)	Shoreline (miles)	Principal Regulation Purpose
Canandaigua Lake	City of Canandaigua	184	16.57	36	WS,WQ,FC,Rec.
Keuka Lake	Village of Penn Yan	179	17.43	19	WS,SQ,Rec.,FC
Seneca Lake	N.Y. Electric & Gas Co. & N.Y.S. Dept. of Transportation	714	66.9	75	WS,Nav.,P,FC, Rec.
Cayuga Lake	N.Y.S. Dept. of Transportation	780	66.4	85	WS, Nav., Rec. FC
Owasco Lake	City of Auburn	206	10.25	25	WS,WQ,FC,Rec.
Skaneateles Lake	City of Syracuse	74	13.8	33	WS,SQ,FC,Rec.
Otisco Lake	Onondaga County Water Authority	42.7	3.4	13	WS,SQ,FC, Rec.
Oneida Lake	N.Y.S. Dept. of Transportation	1382	79.8	55	Nav.,FC, Rec.

WS = Water Supply
WQ = Water Quality
FC = Flood Control
Nav. = Navigation
P = Power
Rec. = Recreation

C-16

HYDRAULICS

RATING CURVE AT LOCK O-2, FULTON

FREE FLOW OVER WEIR AND SPILLWAY, WITH GATES CLOSED

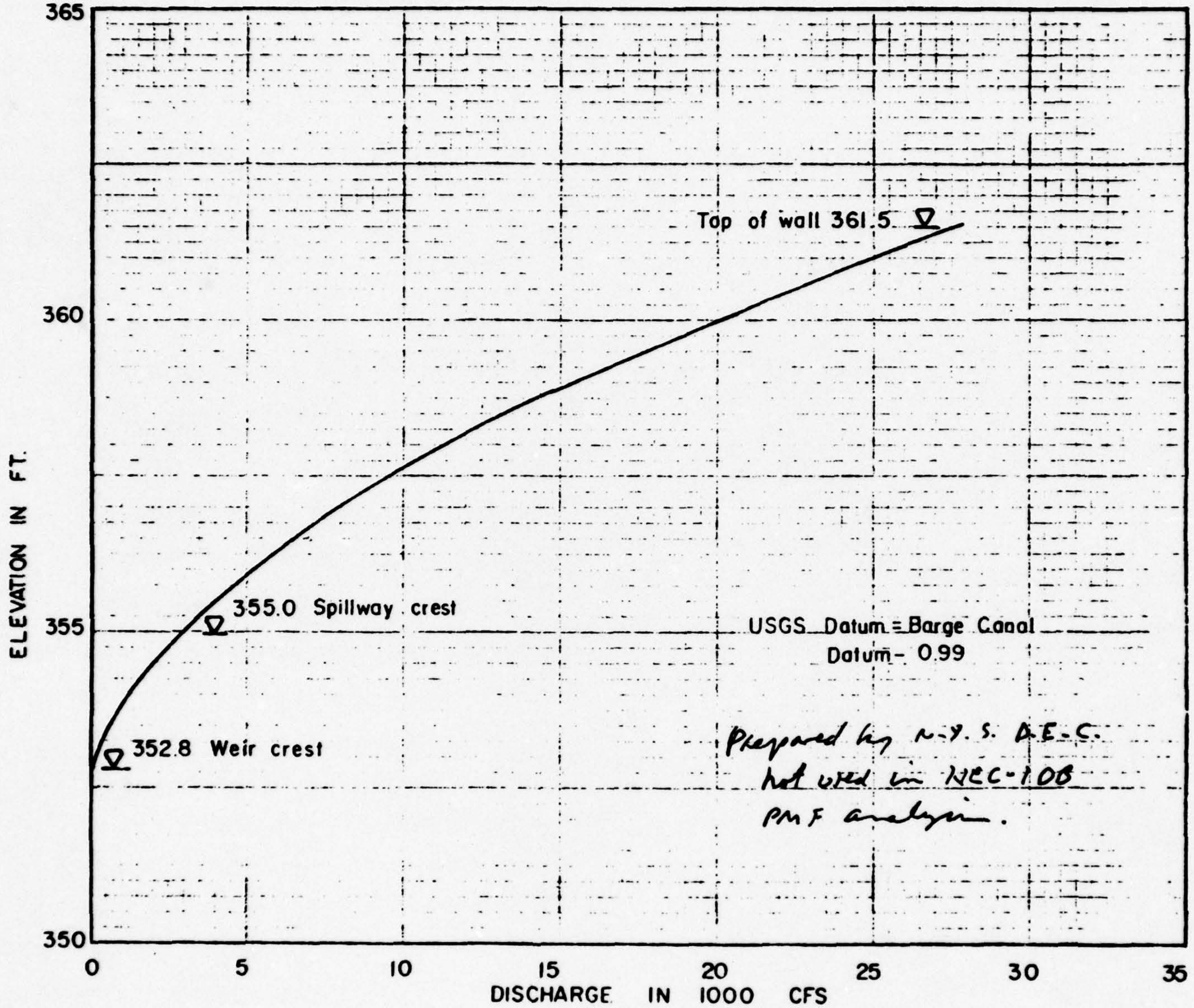
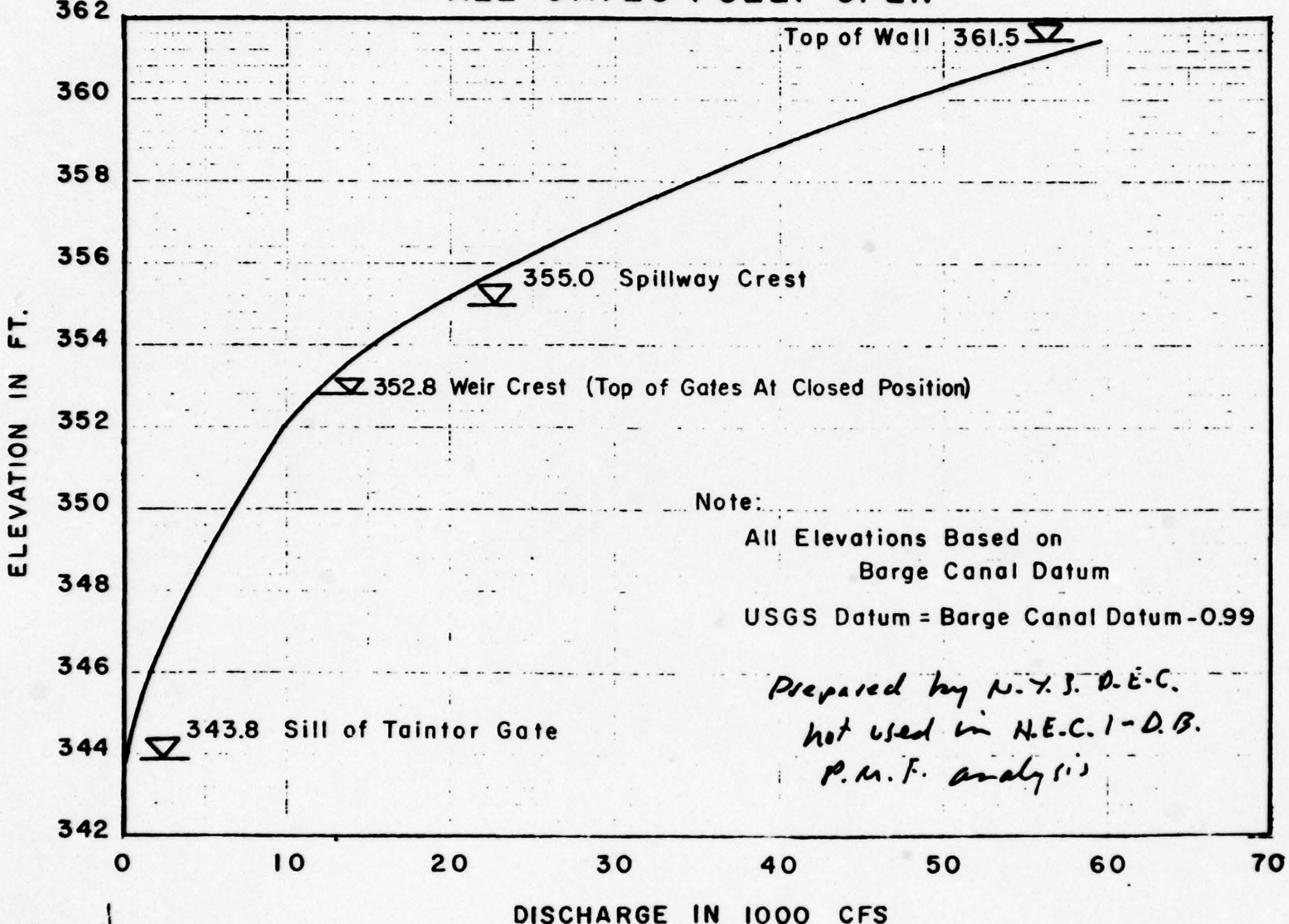


PLATE V-7(c)

RATING CURVE AT LOCK O-2, FULTON

ALL GATES FULLY OPEN



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PROJECT NAME New York State Dam Inspection DATE 6.20.79

SUBJECT Upper Fulton Dam - Lock #2 PROJECT NO. 2305

Stage - Discharge Relationship DRAWN BY JRS & NFD

FREE WEIR FLOW

TAINTER GATES (CLOSED) - 353.0 EL LENGTH - 190'

C = 3.0

ELEV	H	C	l	$Q = C l H^{1.5}$
353	0	3.0	190	0
355	2			1612
357	4			4560
359	6			8377
361	8			12898
363	10			18025
365	12			23695
367	14			29858
369	16			36480
371	18			43530
373	20			50983
375	22			58819
377	24	3.0	190	67018

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6·20·79
SUBJECT UPPER FULTON DAM - LOCK #2 PROJECT NO. 2305
STAGE - DISCHARGE RELATIONSHIP DRAWN BY JPG & NFD

FREE WEIR FLOW (OGEE)
AUXILARY SPILLWAY - 355 LENGTH = 109
$C_d = 4.03$; $H_d = 2.61$

ELEV	He	He/Hd	C/Cd	C	$Q = C l He^{1.5}$
355	0	0	0	0	0
357	2	.766	.96	3.714	1145
359	4	1.532	1.03	4.151	3620
361	6				6650
363	8				10238
365	10				14308
367	12				18808
369	14				23701
371	16				28957
373	18				34553
375	20				40469
377	22		1.03	4.151	46689

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PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6·21·79

SUBJECT UPPER FULTON DAM - LOCK #2 PROJECT NO. 2305

STAGE - DISCHARGE RELATIONSHIP DRAWN BY JPG & NFO

TAINTER GATES (FULLY OPENED)

$$Q = c\,l H \sqrt{2gY_1}$$

$$l = 190;\ H = 14';\ c = .5;\ g = 32.2$$

ELEV	Y_1	2g	$\sqrt{2gY_1}$	clH	Q
358	14	64.4	30.03	1330	39940
360	16	↓	32.10	↓	42693
362	18	↓	34.05	↓	45287
364	20	↓	35.89	↓	47734
366	22	↓	37.64	↓	50062
368	24	↓	39.31	↓	52288
370	26	64.4	40.92	1330	54423

ACCUMULATIVE DISCHARGE

TAINTER GATES - FULLY OPENED

ELEV	WEIR	SPILLWAY	TAINTER GATES	Q TOTAL
358	9282	2305	39940	42245
360	15376	5059	42693	47752
362	22416	8380	45287	53667
364	30288	12216	47734	59950
366	38913	16507	50062	66569
368	48230	21208	52288	73496
370	58191	26286	54423	80709

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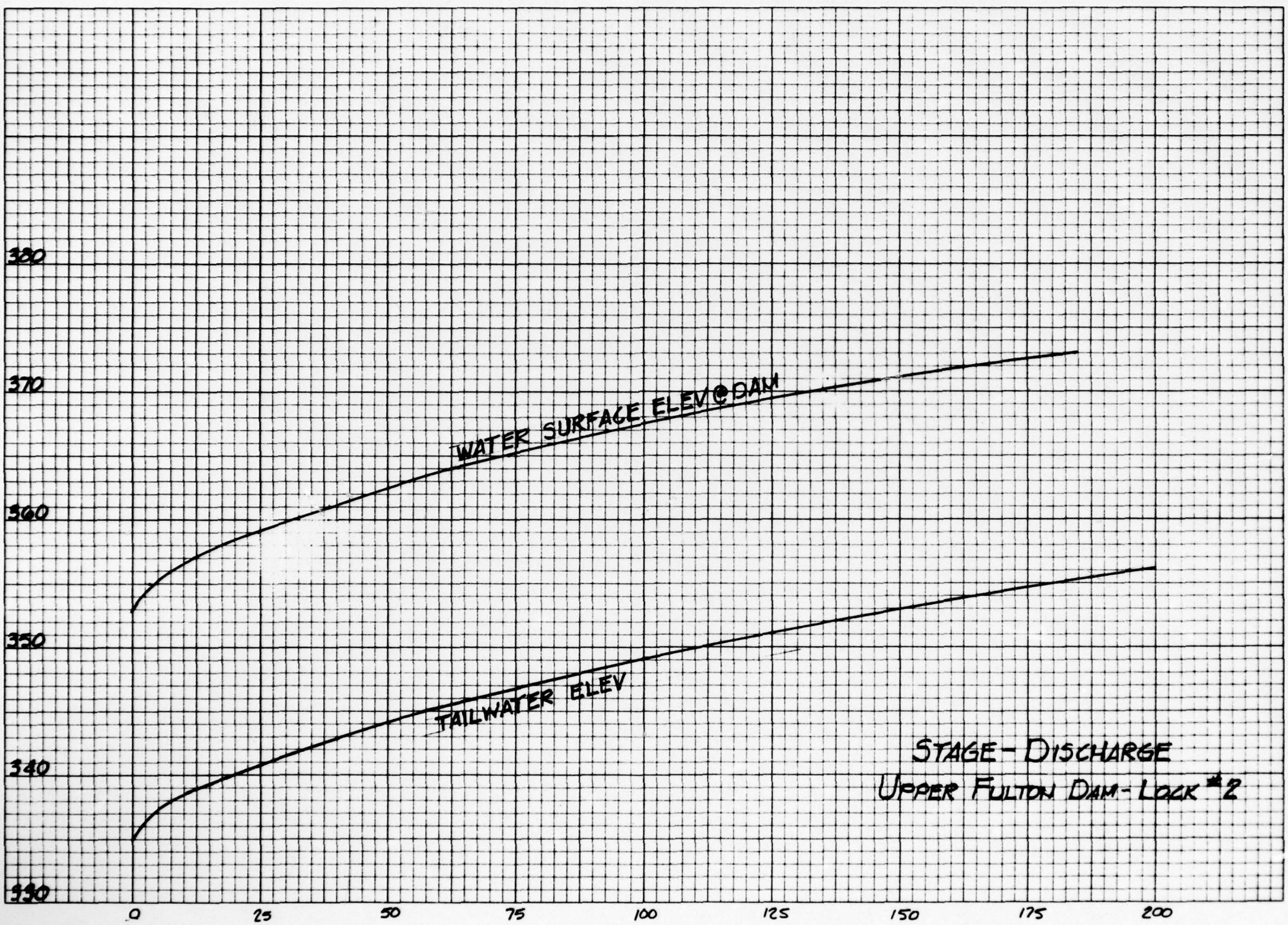
PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6.21.79

SUBJECT UPPER FULTON DAM - LOCK #2 PROJECT NO. 2305

STAGE-DISCHARGE RELATIONSHIP DRAWN BY JPG & NFD

ACCUMULATIVE DISCHARGE

ELEV	WEIR	TAINTER GATES	SPILLWAY	QTOTAL
353	0	0	0	0
355	2101	1612	0	3713
357	6441	4560	1145	12146
359	12201	8377	3620	24198
361	18785	12898	6650	38333
363	26253	18025	10238	54516
365	35511	23695	14308	73514
367	43489	29858	18808	92155
369	53133	36480	23701	113314
371	63400	43530	28957	135892
373	74255	50983	34553	159791
375	85668	58819	40469	184956
377	97611	67018	46689	211318



380
370
360
350
340
330
0
25
50
75
100
125
150
175
200
WATER SURFACE ELEV @ DAM
TAILWATER ELEV
STAGE - DISCHARGE
UPPER FULTON DAM - LOCK #2

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PROJECT NAME New York State Dam Inspection DATE 6.15.79

SUBJECT Upper Fulton Dam - Lock #2 PROJECT NO. 2305

Stage - Storage Relationship DRAWN BY JPG

Elev		End Area (Acre)	Vol (Acre-ft)	Storage (Acre-ft)
342	[illegible]			
344	570	.0235	196.3	196.3
346	[illegible]	.0242	302.5	498.8
348	[illegible]	.0250	520.1	1018.9
350	[illegible]	.0257	747.9	1766.8
352	584	.0264	987.4	2754.2
354	600	.0272	1209.4	3963.6
356	[illegible]	.0278	1270.5	5234.1
358	632	.0287	1311.6	6545.7
360	648	.0294	1343.6	7889.3
362	[illegible]	.0305	1393.9	9283.2
364	[illegible]	.0309	1412.1	10695.3
366	696	.0316	1444.1	12139.4
368	[illegible]	.0323	1476.1	13615.5
370	[illegible]	.0331	1512.7	15128.2

APPENDIX D

STABILITY ANALYSIS

(1)

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DESIGN BRIEF

PROJECT NAME: UPPER FULTON DAM - LOCK #2 DATE:

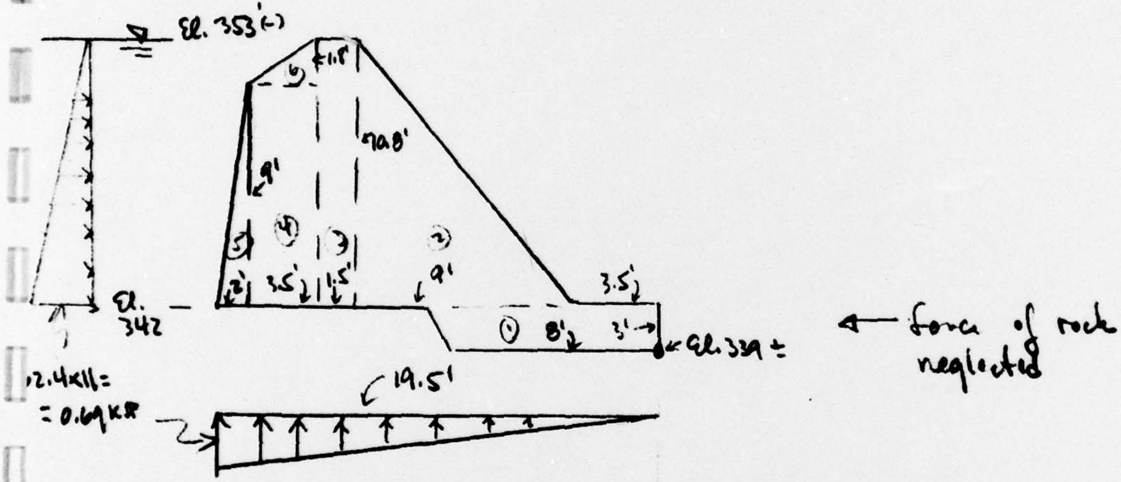
SUBJECT: STABILITY ANALYSIS - OVERTURNING & SLIDING PROJECT NO.:

DRAWN BY:

see attached sheet for dam cross-section

OVERTURNING

I. WL @ normal pool (operating) level — elev. 353' ds - no water



(i) resisting overturning moment about toe: mass of dam

$$= (8\times3\times.15)\left(\tfrac{8}{2}\right) + \left(\tfrac{1}{2}\times9\times10.8\times.15\right)\left(\tfrac{2\times9}{3}+3.5\right) + (1.5\times10.8\times.15)\left(\tfrac{1.5}{2}+12.5\right) +$$

$$+ (3.5\times9\times.15)\left(\tfrac{3.5}{2}+14\right) + \left(\tfrac{1}{2}\times9\times2\times.15\right)\left(\tfrac{2}{3}+17.5\right) + \left(\tfrac{1}{2}\times3.5\times1.8\times.15\right)\left(14+\tfrac{3.5}{3}\right)$$

$$= 14.4 + 69.3 + 13.3 + 74.5 + 24.5 + 7.1 = 203^{\text{ik}}$$

(ii) lateral water pressure behind structure:

$$= \left(0.69\times\tfrac{11}{2}\right)\left(\tfrac{11}{3}+3\right) = 25.3^{\text{ik}}$$

(iii) uplift water pressure on base of dam:

$$= \left(0.69\times\tfrac{19.5}{2}\right)\left(\tfrac{2}{3}\cdot19.5\right) = 87.9^{\text{ik}}$$

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(2)

PROJECT NAME ______ DATE ______
SUBJECT ______ PROJECT NO. ______
______ DRAWN BY ______

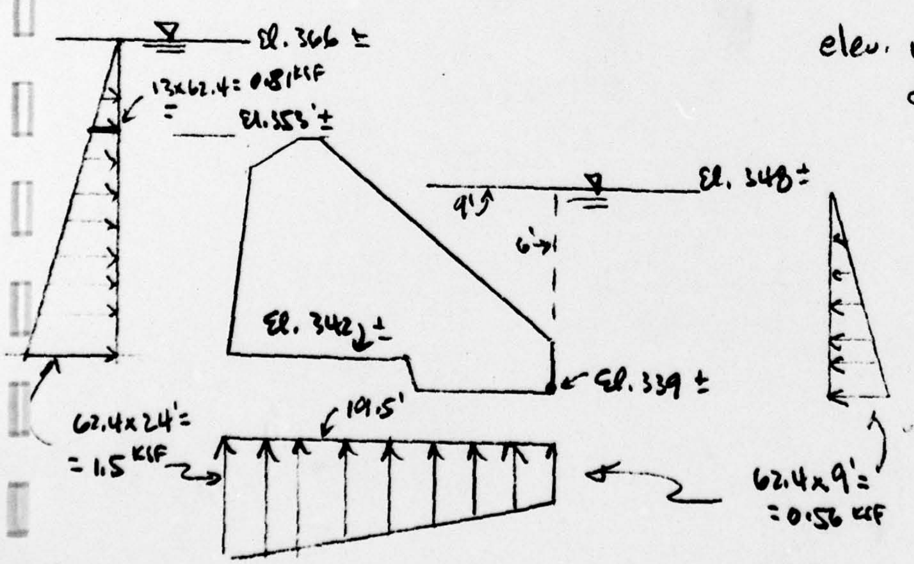
(iv) ovt moment due to ice =
$5^k \times 14' = 70^{'k}$

FS against overturning = $\dfrac{203^{'k}}{(25.3+87.9+70)^{'k}}$ = 1.11 (uplift, ice act) -bad-
183

FS against overturning = $\dfrac{203}{25.3+70}$ = 2.1 (ice acts, no uplift) -ok-
95.3

note: downstream resistance provided by rock neglected (conservative)

II. WL @ PMF elevations upstream and downstream



elev. upstream = 366', 13' above spillway
downstream = 348'

(i) resisting ovt moment: mass of dam + upstream H_2O on top of dam + lat. water pres.

$= 203^{'k} + (\frac{1}{2} \times 6 \times 9 \times 62.4)(\frac{9}{3}) + (0.56 \times \frac{9}{2} \times \frac{9}{3}) = 203^{'k} + 5.05^{'k} + 7.6^{'k} = 216^{'k}$

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(3)

OJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

______ DRAWN BY ______

(iii) Causing out : uplift press (a) + water press behind dam (b) =

$$= \left[\left(0.56^{KSF} \times 19.5' \times \frac{19.5}{2}\right) + \left(0.94^{KSF} \times \frac{19.5}{2}\right)\left(\frac{2}{3} \times 19.5\right)\right] +$$

$$+ \left[\left(0.81 \times 11\right)\left(\frac{11}{2} + 3\right) + \left(0.69 \times \frac{11}{2}\right)\left(\frac{11}{3} + 3\right)\right] =$$

$$= 106.5 + 119.7 + 75.7 + 25.3 = 327^{k}$$

FS against overturning =

$$= \frac{216}{327} = 0.66 \pm$$ (uplift acting) - low -

$$= \frac{216}{75.7 + 25.3} = 2.14 \pm$$ (no uplift) - ok -

101

note: downstream resistance provided by downstream rock and key neglected

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PROJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

______ DRAWN BY ______

SLIDING

I. WL @ normal pool elevation

(i) weight of dam = $(8 \times 3 \times .15) + (\frac{1}{2} \times 9 \times 10.8 \times .15) + (1.5 \times 10.8 + .15) +$

$+ (3.5 \times 9 \times .15) + (\frac{1}{2} \times 9 \times 2 \times .15) + (\frac{1}{2} \times 3.5 \times 1.8 \times .15) =$

$= 3.6 + 7.3 + 2.4 + 4.7 + 1.4 + 4.7 = 24.1^k$

(ii) horiz. water pressure upstream =

$= (0.69^{ksf} \times \frac{11}{2}) = 3.8^k$

(iii) uplift pressure on base of dam =

$(0.69 \times 19.5 \times \frac{1}{2}) = 6.7^k$

FS against sliding (friction shear method, using 50 psi bond-shear between dam concrete and bedrock, $\mu = 0.65$)

$$FS = \frac{\mu N + \text{bond/shear}}{\text{upstream waterpress + ice}} = \frac{(0.65)(24.1 - 6.7) + (.05 \times 144 \times 19.5)}{(3.8 + 5)}$$

$$= \frac{11.3 + 140.4}{8.8} = \frac{151.7}{8.8} = 17 \pm \qquad -(ok)-$$

FS against sliding (friction only along base, no shearbond)

$$= \frac{11.3}{8.8} = 1.3 \pm \qquad -(ok)-$$

note: these FS values neglect resistance provided by downstream rock and key

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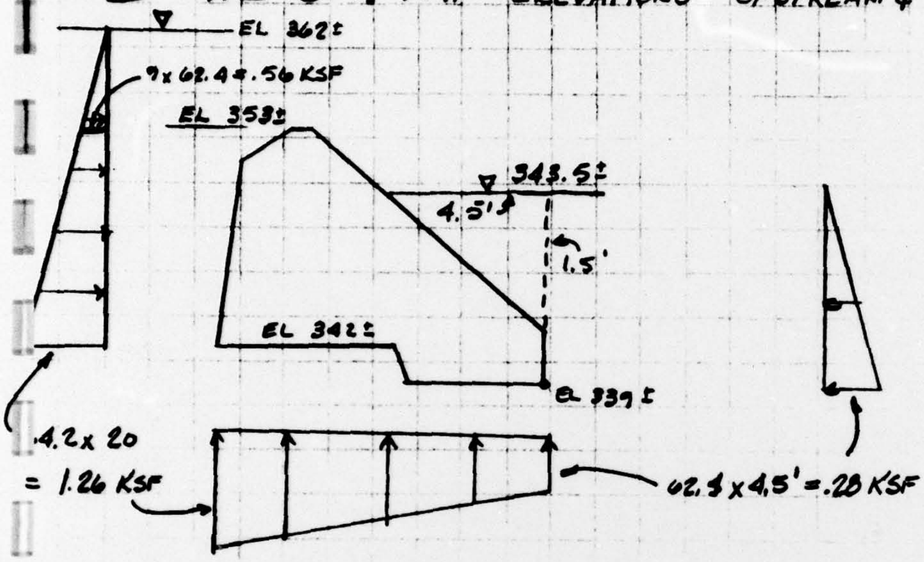
PROJECT NAME ____ DATE ____

SUBJECT ____ PROJECT NO. ____

____ DRAWN BY ____

Sm

III WL @ 1/2 PMF ELEVATIONS UPSTREAM & DOWNSTREAM



EL: UPSTREAM 362.0

DOWNSTREAM 343.5

9' ABOVE SPILLWAY

(i) RESISTING OVT MOMENT = MASS OF DAM + UPSTREAM H_2O ON TOP OF DAM + LATERAL H_2O PRESSURE

$$= 203 + \text{NEGLECT} + \left(0.28 \times \frac{4.5}{2} \times \frac{4.5}{3}\right) = 204$$

(ii) CAUSING OVT = UPLIFT PRESSURE + H_2O PRESSURE BEHIND DAM

$$= \left[\left(.28 \times 19.5 \times \frac{19.5}{2}\right) + \left(.98 \times \frac{19.5}{2}\right)\left(\tfrac{2}{3} \times 19.5\right)\right] + \left[(.56 \times 11)\left(\frac{11}{2} + 3\right) + (.70 \times 1\tfrac{1}{2})\left(\frac{11}{3} + 3\right)\right] = 53.2 + 124.3 + 52.4 + 25.7 = 255.6$$

FS AGAINST OVERTURNING

$\frac{204}{256} = .80\pm$ (UPLIFT ACTING) -LOW-

$\frac{204}{(52.4 + 28.7)} = 2.61\pm$ (NO UPLIFT) -OK-

(5)

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PROJECT NAME ____ DATE ____
SUBJECT ____ PROJECT NO. ____
____ DRAWN BY ____

II. WL @ PMF elevations

(i) wt. of dam = 24.1^k

(ii) downstream water above dam section = $(\frac{1}{2} \times 6 \times 9 \times 62.4) = 1.68^k$

(iii) downstream horiz. water pressure = $(0.56 \times \frac{9}{2}) = 2.5^k$

(iv) upstream horiz. water pressure = $(\frac{0.81+1.5}{2})(11) = 12.7^k$

(v) uplift on base of dam = $(\frac{1.5+0.56}{2})(19.5') = 20.1^k$

FS against sliding (friction-shear method, using 50 psi bond-shear between dam and bedrock, $\mu = 0.65$)

$$FS = \frac{\mu N + \text{bond/shear} + \text{downst. water press}}{\text{upstream horiz. water pressure}}$$

$$= \frac{(0.65)(\overset{2.6}{24.1 - 20.1})^k + (.05 \times 144 \times 19.5)^k + 2.5^k}{12.7^k} = \frac{145.5}{12.7} = 11.5^{\pm}$$

(uplift acts)

-ok-

FS against sliding (friction only, no bond-shear)

$$FS = \frac{(0.65 \times \overset{2.6}{4}) + 2.5}{12.7} = 0.4$$ (uplift acts) -low-

$$FS = \frac{(\overset{15.67}{0.65 \times 24.1}) + 2.5}{12.7} = 1.43$$ (no uplift) -ok-

note: these FS neglect resistance provided by downstream rock and key

III WL @ 1/2 PMF ELEVATIONS

(i) WEIGHT OF DAM 24.1 K

(ii) DOWNSTREAM WATER ABOVE DAM SECTION - NEGLIGIBLE

(iii) DOWNSTREAM HORIZ. WATER PRESSURE $(.28 \times 4.5/2) = 1.26$

(iv) UPSTREAM HORIZ. WATER PRESSURE $\left(\frac{.56+1.26}{2}\right)(11) = 10.01$

(v) UPLIFT ON BASE OF DAM $\left(\frac{1.26+.28}{2}\right)(19.5) = 15.01$

FS AGAINST SLIDING (FRICTION - SHEAR METHOD, USING 50 PSI BOND-SHEAR BETWEEN DAM & BEDROCK; $\mu = 0.65$)

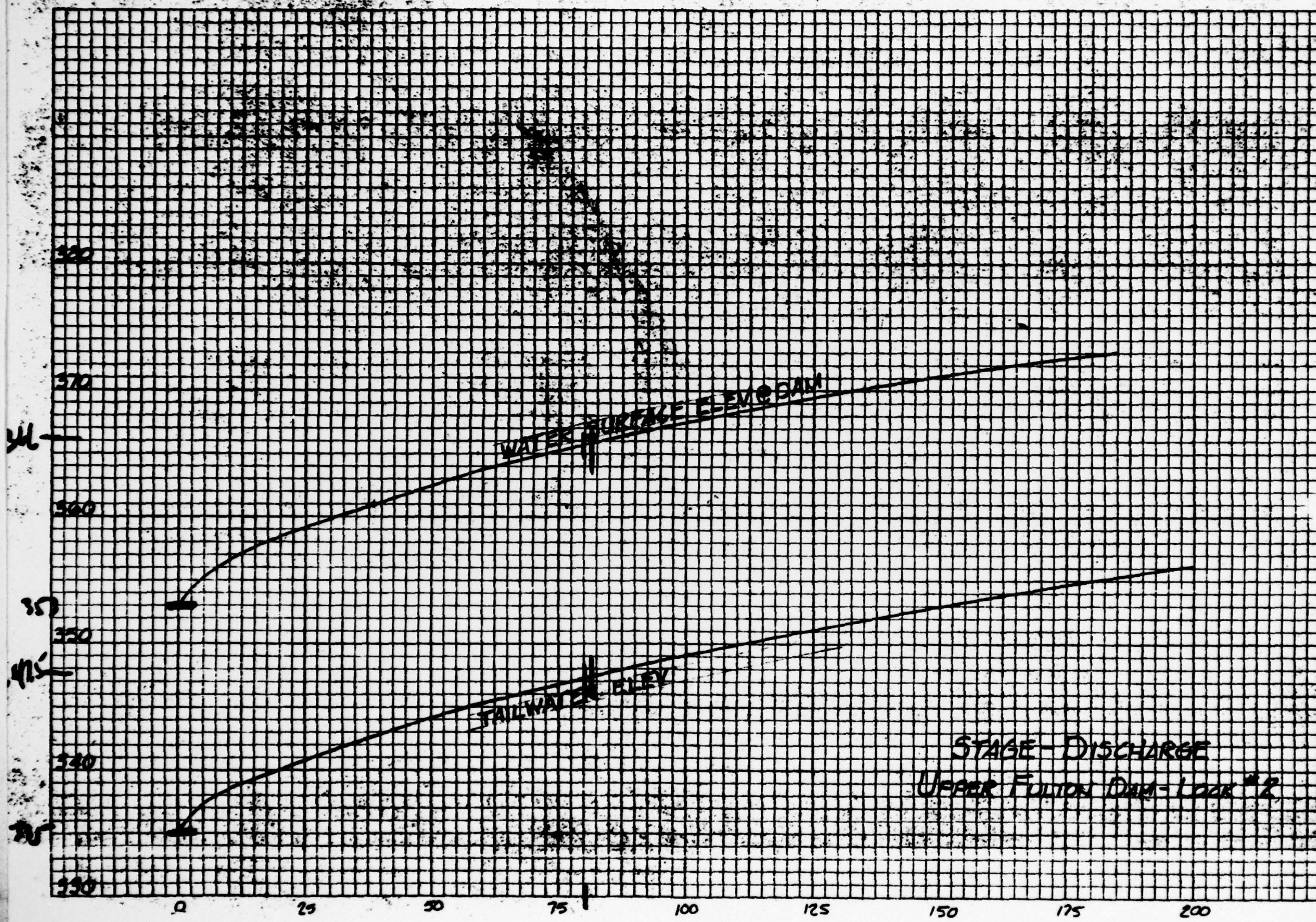
$$FS = \frac{\mu N + \text{BOND/SHEAR} + \text{DOWNSTREAM } H_2O \text{ PRESSURE}}{\text{UPSTREAM HORIZ } H_2O \text{ PRESSURE}}$$

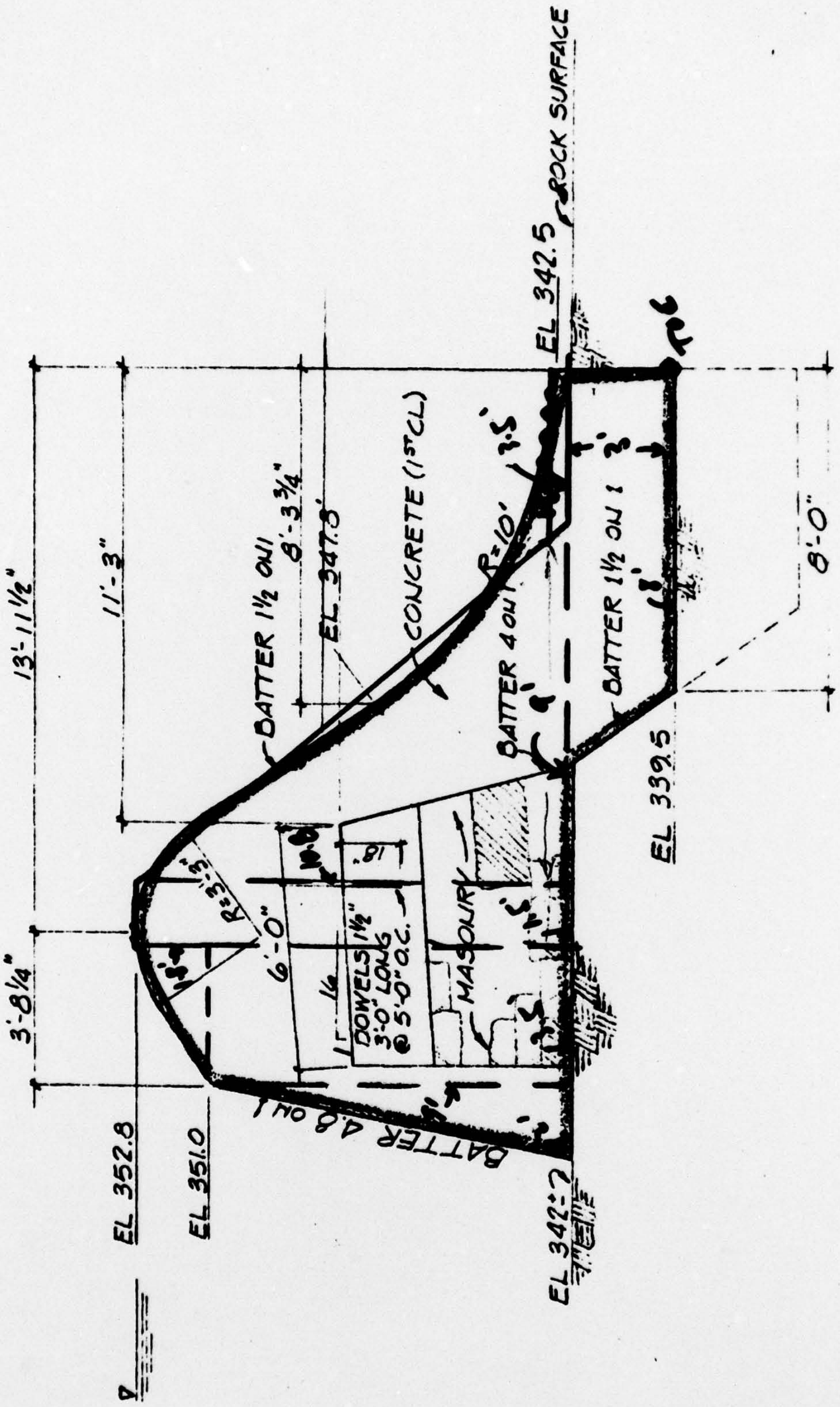
$$= \frac{\overset{5.91}{(0.65)(24.1-15.01)} + \overset{140.4}{(.05 \times 144 \times 19.5)} + 1.26}{10.01} = \frac{147.57}{10.01} = 14.6 \text{ -OK-}$$

FS AGAINST SLIDING (FRICTION ONLY, NO BOND-SHEAR)

$$FS = \frac{(0.65 \times 9.09) + 1.26}{10.1} = .71$$ (UPLIFT ACTS) -LOW-

$$FS = \frac{(0.65 \times 24.1) + 1.26}{10.1} = 1.67$$ (NO UPLIFT ACTS) -OK-


380
370
366
360
353
350
345
340
335
330
0
25
50
75
100
125
150
175
200
WATER SURFACE ELEV @ DAM
TAILWATER ELEV
STAGE-DISCHARGE
UPPER FULTON DAM-LOCK #2



UPPER FULTON DAM - LOCK No 2

SCALE 1/4 = 1'-0"

STETSON · DALE	DATE 6·21·79	DRAWN JPG	STRUCTURAL ANALYSIS
	JOB 2305	APP'D	

APPENDIX E

REFERENCES

APPENDIX

REFERENCES

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